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SEPTEMBER 1983
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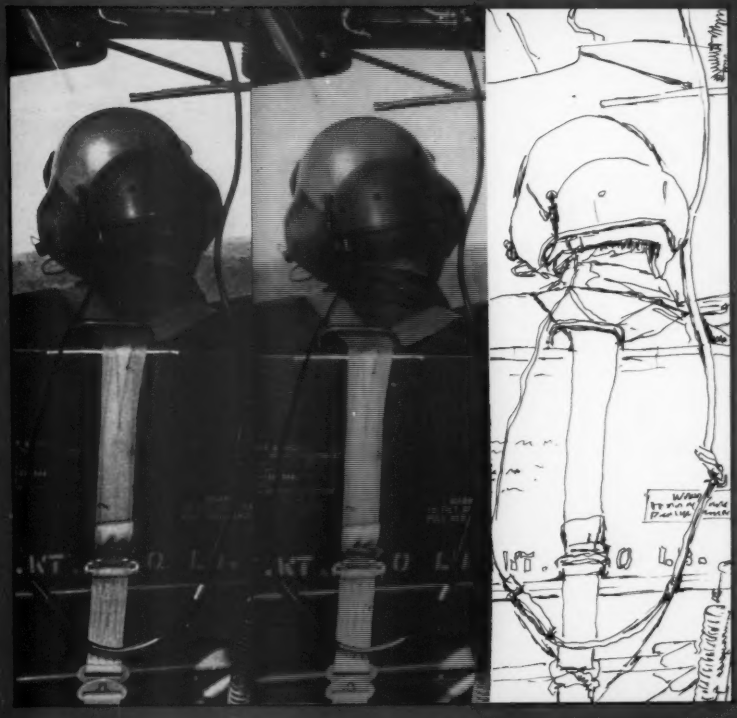

Flight Simulators

SEPTEMBER 1983 • VOLUME 29 • NUMBER 9

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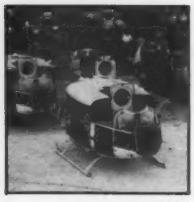

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Honorable John O. Marsh Jr.
Secretary of the Army

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Editor

The mission of the *U.S. Army Aviation Digest (USPS 415-350)* is to provide information of an operational, functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine and other related data.

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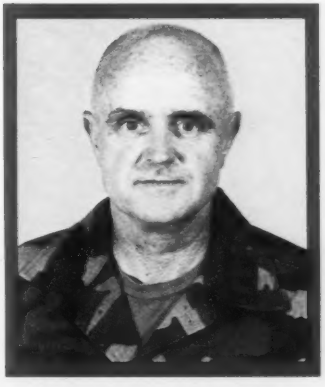
ANYTIME WE can get more for our constrained resources than we thought possible, we're doing okay. That's the case with the Flight Simulator Branch (FSB) at Ft. Bragg, NC. In this month's lead article, "You Can't Hardly Tell It From the Real Thing," Ms. Betty Goodson tells us how the four UH-1FS cockpits used at Ft. Bragg are returning maximum benefits. Troop A, 1/17 Cav, 82d Airborne Division is the chief benefactor of tactical deployment training that is billed as being 98 percent "as real as you can possibly get it." That is using the simulator to do more than it was designed to do. I recommend that you read this story. Perhaps you can pick up some ideas, or maybe you can share a few innovative ideas with us about how your flight simulators are being used to increase their productivity.

"Aviation at the Infantry School" authored by Captains Thomas H. Harrison and John M. Hopkins gives us awareness of the training provided officers and NCOs on the technical aspects of air assault operations, preparing them to conduct these operations at squad, platoon and higher levels. The Infantry Officer Advanced Course emphasizes planning battalion air assault operations from PZ to completion of the ground tactical phase. Addressed in this training are offensive air support, attack helicopters, joint air attack teams, mortars, artillery and naval gunfire. The authors emphasize course graduates need the advice and input of aviators when planning air assault operations and point out correctly that the way we cooperate and train is how we'll fight as a combined arms team.

The need for "Attack Helicopters in the Escort Role" is presented by Major Lawrence E. Casper in his excellent article. Our current FMs are woefully inadequate in this area and we will fix that; the mission is real.

Some readers may not be fully aware of the services provided by "Corpus Christi Army Depot." Warrant Officer L.J. Simone tells us about the facility as well as the maintenance and logistics that helicopters go through during the thorough overhauls.

The articles in this issue all combine to present us as Army aviators with professional information and creative thoughts on how to do our jobs better and in a safe manner.



Major General Bobby J. Maddox
Commander, U. S. Army Aviation Center
Fort Rucker, AL

Betty J. Goodson

"You can't hardly tell it from the real thing"

These "flights" conducted under various simulated flight and weather conditions are very close to actual flying. You can practice maneuvers that are impractical in a real flight.

FOUR HELICOPTERS went out and three returned. The crews who survived the tactical instrument flight near the forward line of own troops are now at the holding area. They're talking about their buddies whose Huey was hit by enemy fire while going into a landing zone:

"Can you believe Joe and Harry doing a dumb thing like that?"

"C'mon, don't be so hard on them. Authenticating a call to come in and pick up wounded is not always easy to do, especially when you've got a million other things to think about."

"Sure it's not easy. But man, when you're flying that close to the enemy there's no room for mistakes. You've got to know the CEOI (Communications-Electronics Operation Instructions) and identification procedures and use 'em right. Being careless can be deadly, can't it, Harry?"

Standing at the group's edge, looking as if he would rather be anywhere else, Harry had to agree with his harassers' comments. But he and Joe are lucky. They were "shot down" in a flight simulator. So they lived to profit from their mistake.

"It won't happen again," the two errant aviators vow.

Realistic Simulator Training Maintains Unit Integrity

Harry and Joe are fictitious; but the scenario they were participating in at the Flight Simulator Branch (FSB), Ft. Bragg, NC, is not. Such training is the unique way personnel of Troop A, 1/17 Cav Squadron, 82d Airborne Division, XVIII Airborne Corps, obtain maximum benefit from the installation's UH-1FS (2B-24 flight simulator).

According to the troop's instrument flight examiners, Chief Warrant Officers, CW3 John E. Loftus and CW3 Kenneth M. Cowles, the advantages are numerous: Tactical deployment maneuvers are practiced under instrument meteorological conditions, whereas in the aircraft they can only be done under VFR (visual flight rules). Blade time (read that money) is saved. The four cockpits are used for a 4-hour period (some as OH-58s, some as AH-1s, some as UH-1s/UH-60s... aircraft organic to the Cav), so unit integrity is maintained and the training is easier to monitor. Too, their peer group's presence is a strong motivating factor for the aviators to do everything right (no one wants to be in "Harry's" shoes!).

"We tie the four cockpits together with communications where we can hear all transmissions," CW3 Loftus said, "and we have people working the different positions, such as ground control, tower and departure control. There'll be a 2-hour normal IFR (instrument flight rules) training period and then we go into the tactical instrument portion.

"The aircraft (cockpit) will leave the federal airspace at a designated intersection and will contact the flight operations center, and that drops them down into the tactical instrument mode. Then the missions are assigned by radio.

"One crew may be told to proceed to landing zone Black, drop off supplies and evacuate wounded. We may simulate shooting one of the aircraft down and designate another to be a recovery aircraft and find the downed crew. Under instrument conditions, that's not easy to do.

"We try to mix the missions up so each aviator gets to make as many types of approaches as possible. Usually there is time for two or three in different areas in the 2-hour tactical period."

How realistic is this simulated training? Mr. Charles H. Astrike, instrument flight examiner for the XVIII Airborne Corps, gives it a high rating.

"It is probably 98 percent as real as you are ever going to get. It is that true, and it is using the simulator to do more than it was actually designed to do," he said.

CW3 Kenneth M. Cowles and CW3 John E. Loftus, instructor pilots from Troop A, 1/17 Cavalry Squadron, 82d Airborne Division, assist in cockpit control during tactical instrument training at the ground control approach pedestal.

photographs by Nancy A. Zamoraki

Flights Tailored To Their Needs Challenge Aviators

Troop A's unit training is just one of the innovative ways the Flight Simulator Branch supports about 535 Active Army and 150 Reserve Component aviators. A primary reason is its staff composition.

Mr. Charles Leeds, branch chief, explained: "We have console instructors, not console operators, to run this device. I believe that is essential. An operator does only that, operates the equipment; but an instructor can *use* it to give aviators the utmost good from simulator training. Changing departure fields, takeoff weights and weather daily helps accomplish that.

"All of our instructors have rotary wing pilot experience. To maintain their proficiency, they're required to undergo an annual evaluation, complete the UH-1 dash 10 written examination and they also take the Annual Written Examination.

"Our ultimate goal is to meet the aviators' needs and to challenge them to want to learn. We do not use the word 'student' around here, by the way. Whether they've been flying 20 days or 20 years, these rated aviators are professionals and we treat them accordingly."

Major Edward L. Monhollen Jr., chief of the Flight Standardization Branch and Mr. Leeds' supervisor, offered some evidence about how the instructors' goals are met. He said: "Consider these figures: Since the simulator was installed in January 1977, the aviator use rate (based on two aviators per cockpit) has been 97 percent of the time made available to the aviation units; the maintenance availability rate has been in excess of 99 percent; and we've had an extremely low cancellation rate, with people on a waiting list to take those periods.

"Now, if the commanders and training officers didn't support the program and their aviators were not

LEFT: Console instructors maintain communication with aviators undergoing training and monitor simulator flight progress by viewing information displayed on cathode ray tubes at the flight control station.

BELOW: WO1 Joseph R. Bradley, 57th Medical Detachment, refers to his map during flight training in the simulator. The simulator provides realistic hands-on training for Ft. Bragg pilots.

being challenged by this program Mr. Leeds and his crew have put together, I don't think you'd find that kind of use being made of the simulator.

"Believe me, when you have aviators leaving a simulator cockpit after a 2-hour period and they're excited about the flight they've had, that is unusual. It happens here—and I'm sure it is because they realize they are doing what they need to do to be better aviators. They're not spending their time flying around on a canned flight."

How are canned flights avoided? How can Mr. Leeds and the other console instructors know the particular needs of each aviator?

One answer suffices for both those questions, Mr. Leeds said: The training is designed by the unit commander and/or training officer to meet the individual aviator's training requirement. The aviator brings the assignment to the Simulator Branch, prepares a flight plan—with help from the instructor if needed—and enters the cockpit for a custom-tailored flight.

For instance, the following is how the four cockpits were used in a recent training period: (1) Two test pilots from a direct support maintenance unit made a test flight to gain experience in checking hydraulics, circuit breakers, flight control and electrical systems. (2) A colonel flew an instrument cross-country with an instructor pilot and experienced radio failure in order to hone the colonel's coping skills on that. (3) Tactical instrument flight instructions were given to two warrant officers, recent flight school graduates. (4) An instrument flight examiner gave a captain his annual instrument checkride.

Still another profitable use made of Ft. Bragg's flight simulator is to help prepare aviators who are selected to attend the instrument flight examiner course—reputed to be one of the Army's toughest—at Ft. Rucker, AL. They are detailed to the FSB for 2 or 3 weeks where they'll fly whenever there's a seat available, answer questions popped at them by the instructors and study all pertinent publications.

Console instructors Mr. Charles Dye (left) and Mr. Glenn Allen monitor flight progress during aviation training in the XVIII Airborne Corps and Ft. Bragg flight simulation control station at Simmons Army Airfield.

"The value of that," Major Monhollen declared, "is proven by the fact that all the people who have spent preparatory time here have successfully completed the course. Conversely, two who did not come in for that training did not make it through the first week at Ft. Rucker."

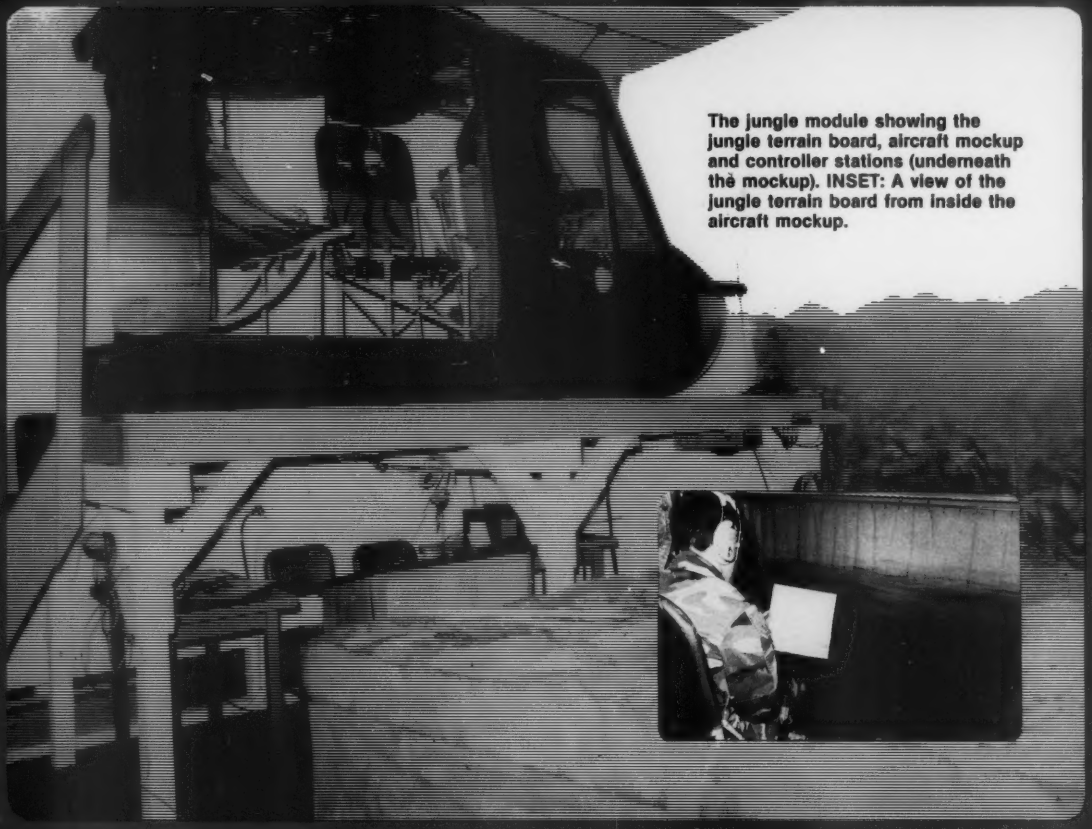
Command Support and Positive Attitudes are Keys to Success

Whether they wear wings with a star and wreath or with a just-minted shine, all the aviators benefit from the console instructors' knowledge and ability to do new and different things with the device.

For example, a unit commander came in one day and asked Mr. Leeds if the Huey simulator could fly like the UH-60 Black Hawk. After some computations and head-scratching, they decided it could. They did the approaches at 120 knots (compared with 90 for the UH-1), made some changes in the aircraft weight within the computer, and achieved a simulated Black Hawk ride.

That commander was excited about the possibilities of training his unit members could receive in the simulator. Such enthusiasm is typical of the command support the Flight Simulator Branch receives from all echelons. That, in turn, motivates the aviators' positive attitudes; and they derive maximum benefit from the equipment's successful operation.

Harry and Joe were going to make a closing statement, but they're too busy studying identification procedures. They have another flight scheduled tomorrow.



The jungle module showing the jungle terrain board, aircraft mockup and controller stations (underneath the mockup). INSET: A view of the jungle terrain board from inside the aircraft mockup.

Aviation at the Infantry School

Army Aviation and infantry are not mutually exclusive terms, but partners in the combined arms team. You may be surprised to learn what's going on as part of the Infantry Center's aviation-related instruction at Ft. Benning, GA, that can help your aviation unit.

CW3 DOZEOFF and CPT Nofly were talking about tomorrow's airmobile mission during a slow moment at the B Company operations building on Gloomy Airfield.

"Well," laughed Dozeoff, "it looks like this mission request is just like all the others from that same infantry battalion. I'll just swag the times for planning purposes. They won't care if we're a little off schedule."

"Yeah," replied Nofly, "one good thing about infantry, you can tell them just about anything concerning aviation and they'll buy it."

Just then the door to operations opened and an unfamiliar face appeared.

"Hello," said an Infantry captain, "I'm Captain Straight, new S3 air for the 1/1 Infantry, just out of the Infantry Advanced Course at Ft. Benning. I need to talk to someone about tomorrow's airmobile training."

"Gosh, captain," replied Dozeoff, "a phone call would've done."

"I don't think so," replied Straight, "I've got your copies of the OPORD, air movement tables and flight routes, fire support annex, CEOI extracts, and instructions for a final time hack, so we probably need to talk face to face. By the way, do we get a liaison officer, and who's the airmission commander for tomorrow? I need to talk with him about ground speed."

Dozeoff and Nofly reeled from the effects of Straight's speech. It finally happened, a no-nonsense, by the FM 90-4, airmobile-oriented S3 air. What a fate for easy going Bravo. What could be worse?

"Also," queried Straight, "when will you guys be ready for some night vision goggles missions?"

Nofly fainted.

Of course, this little meeting was over dramatized. Few, if any, combat support aviation companies reflect our Bravo Company's attitude. Also, not many S3 air officers can be up and ready to go a whole day before an airmobile mission. The truth lies in between. Often an aviation unit will do much of the planning for an airmobile operation because of its experience and as a training tool for younger aviators. The 101st Airborne Division (Air Assault) permanently assigns combat aviation parties and combat aviation teams to unit level to enhance mission planning and to provide personnel where needed. (See "Putting the Air Assault In The Air Assault Division," *Aviation Digest,* May 1982.)

All infantry units are required to maintain proficiency in airmobile operations, and to do this they must become proficient in planning airmobile operations in accordance with Field Manual 90-4 and local standing operating procedures. There are no positions within infantry battalions for aviators or pathfinders such as the 101st uses. What about having aviators plan large portions of the mission, particularly air movement and routes? Well, there's no problem with soliciting advice, but there is a problem with having aviators do it all, and that is because we won't be able to fight that way. While a combat support aviation company may support one infantry battalion a day in training, that number may increase to four or five a day in combat depending on the circumstances. The aviation unit will never be able to plan all those missions. At best, it can offer advice, so the burden falls on the infantryman. Ft. Benning's Infantry School prepares officers and noncommissioned officers to plan and conduct airmobile operations at all levels. For example, the Infantry Officer Basic and Advanced Noncommissioned Officer Courses (ANCOC) receive a similar block of instruction on the technical aspects of airmobile operations that prepares students to conduct the operations at squad and platoon level.

Their instruction includes blocks on marking pickup zones (PZ) and landing zones (LZ), attack helicopters, medevac requests, safety, LZ and PZ capacity and suitability, hand and arm signals, slingloads, the airmobile reverse planning sequence, and capabilities and limitations of aircraft. This provides a strong technical and theoretical background for the squad and platoon aspects of airmobile operations.

In the Infantry Officer Advanced Course, great emphasis is placed on the planning and conduct of airmobile operations to include simulating a battalion airmobile operation from the PZ to completion of the ground tactical phase. Blocks of instruction include a briefing on the planning and execution of the Son Tay Raid (an attempt to rescue POWs), a briefing and panel discussion by the 101st Airborne Division (Air Assault), a period on planning airmobile operations

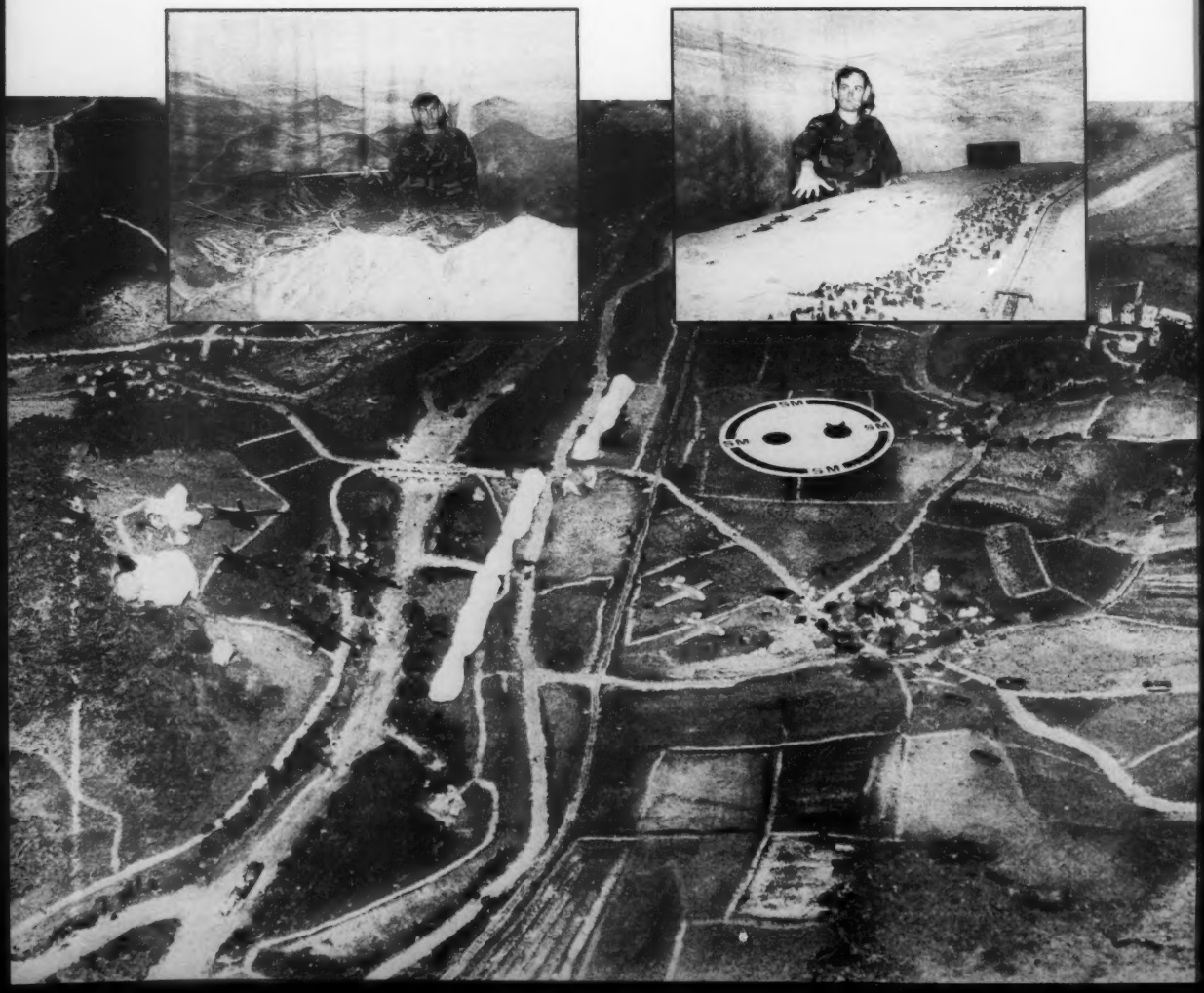
Captain Thomas M. Harrison
and
Captain John M. Hopkins
Headquarters, U.S. Army Infantry School
Fort Benning, GA

to include an analysis of how airmobile operations are affected by the factors of METT + T (mission, enemy, troops, terrain + time) and the reverse planning sequence for airmobile operations.

Emphasis is placed on the use of control measures, developing and designating flight routes, preparation of the air movement table, the technical requirements for helicopter LZ and PZ organization. Fire support planning during airmobile operations is another important block of instruction. Questions posed here include how to best suppress enemy air defense, how to best plan fire support along flight routes, whether or not to prep an LZ and how to plan fires in-depth in order to ensure adequate coverage.

In addition to mortars and artillery, offensive air support, attack helicopters, joint air attack teams (JAAT) and naval gunfire are all addressed during this block. The highlight of the Infantry Officer Advanced Course airmobile instruction is the planning and execution of battalion airmobile operations, to include a real time simulation. Students are organized into battalion staff planning groups and required to plan four separate airmobile operations; a raid in a desert environment, an antiarmor delay in Europe, a recon-

LEFT BELOW: Captain Harrison pointing out an enemy air defense position on the mountain terrain board. RIGHT BELOW: Captain Hopkins instructing a student in airmobile operations. BOTTOM: The European terrain board in the combined arms tactical training simulator.



An airmobile operations order spread across a table.

naissance in force in a jungle setting, and a secure-and-defend operation in mountainous terrain.

After planning all four missions each staff will execute one operation as it planned it in the Ft. Benning Combined Arms Tactical Training Simulator (CATTS). The scenarios are constantly upgraded and now include UH-60A Black Hawks, Division 86 organizations and JAAT play. The free play simulation in the CATTS provides immediate feedback to students on how well they planned and executed their missions.

The Infantry Pre-Command Course (IPCC), comprised of brigade and battalion command designees, also includes (as an elective) an update on airmobility focusing on what commanders can expect of their captains and lieutenants when conducting airmobile operations and what changes have occurred in aviation that will affect airmobile operations. IPCC students who request additional training also are given access to the CATTS.

In November 1982, Colonel James R. Harding, as 2d Brigade commander, 101st Airborne Division (Air Assault) planned and executed the secure-and-defend scenario while in IPCC. Coordination is currently underway to make CATTS resources available to Colonel Harding's battalion staffs for training purposes. These facilities also can be made available to any other interested parties.

The Infantry School emphasizes that aviation is part of the combined arms team to students in courses from ANCOC to IPCC. The utmost in coordination and cooperation is required to bring about successful airmobile operations. When coordinating support for an airmobile operation remember that we'll fight the way we trained. Infantry Officer Advanced Course graduates are capable of planning and executing airmobile operations in a professional manner. They will need your advice and input to do this. Don't shortchange them by using standardized routes and movement tables, or underestimating their ability.

"You know, Dozeoff, that was a slick operation," laughed Nofly as he called Gloomy Tower for landing.

"Yes sir," replied Dozeoff, "I've got to hand it to that CPT Straight, he's really something. I guess we've misunderstood this airmobile thing all along."

NOTE: If elements you support are interested, the CATTS scenarios and training are available for any unit. Call (AUTOVON) 835-1842/2519 for information or write:

Commander, USAIS
ATTN: ATSH-B (TM 3)
Ft. Benning, GA 31905

Major Lawrence E.Casper

Major Casper was a combat aviation battalion S3 and an attack helicopter company commander in a light infantry division when he wrote this article. He is currently assigned to U.S. Air Force Air Command and Staff College, Maxwell Air Force Base, AL.

Attack Helicopters in the Escort Role

THE GROUP of attack aviators were huddled around the carbon-blackened stove in the briefing tent awaiting the operations order for their next mission. They'd been doing a lot of waiting for a couple of days, and they were anxious to get back in the battle. After all, they came out on this division field training exercise to demonstrate what attack helicopters can do.

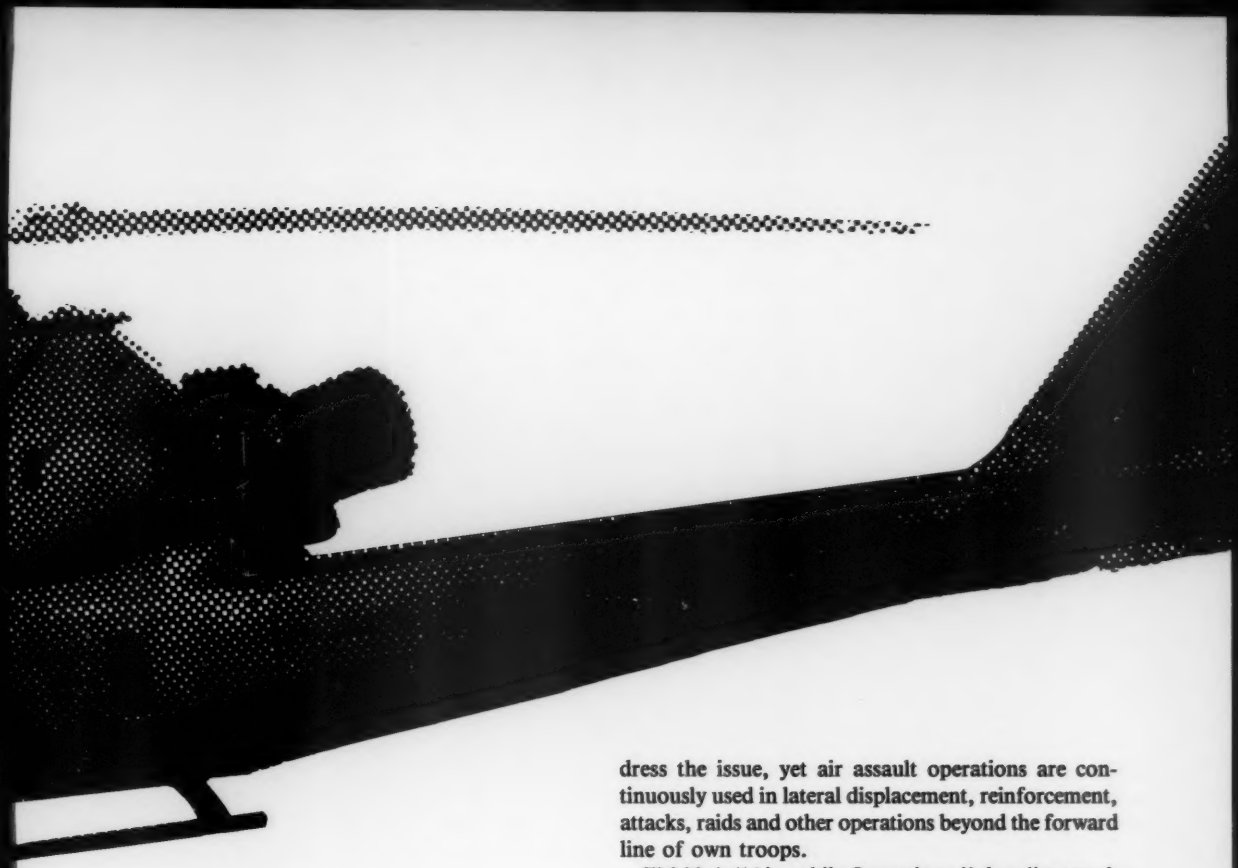
The operations officer poked his head through the tent flaps, stepped in, started taking his gloves off, and in a somewhat disgusted tone proclaimed, "Well, another escort mission."

Bob, a tall, boyish Cobra pilot, responded, "Here we go again. Don't these people know how to employ an 'attack' company?"

"Typical infantry mentality," scoffed Doug, a scout section leader.

"No, that's Vietnam 'thinking,'" shouted Denny, a Vietnam vet and Cobra standardization instructor pilot (SIP).

"That's the trouble with a light infantry division, they shouldn't have an attack unit anyway. They're only capable of thinking a couple of kilometers an hour," blasted Bill, a steely eyed scout SIP and ex-



perienced battle captain.

The operations officer raised his hand and his voice, "OK, knock off the 'bull' and settle down. We have a mission to accomplish and a lot of people are depending on us, so pay attention."

How often have you heard a dialogue similar to this take place? If you are in an attack helicopter company, it is probably more often than you care to.

Well, is there any validity in attack helicopters escorting assault aircraft? There is no doubt that during air assault operations good preplanning of artillery fires is hard to replace when you need help fast to suppress any unexpected "bad guys." But what if you have communication problems and our artillery doesn't get the call, or what if the mission places the air assault task force out of artillery range? What if low ceiling or poor visibility negates the use of our Air Force? What does the commander do to increase the odds of a successful mission?

The question of attack helicopters assuming the escort role is highly controversial to say the least. Field Manuals (FM) 17-47, 17-50 and 17-95 do not even address the issue, yet air assault operations are continuously used in lateral displacement, reinforcement, attacks, raids and other operations beyond the forward line of own troops.

FM 90-4, "Airmobile Operations " does list attack helicopters as supporting elements of an air assault task force, and states, "Attack helicopters should destroy or suppress enemy infantry, tanks, and air defense weapons, and OVERWATCH AND PROVIDE SECURITY FOR ASSAULT AIRCRAFT." The mission is real, and it's one that many members of the attack community do not like to perform.

In a light infantry division, the attack helicopter company offers the largest, most concentrated array of antitank firepower, more than any other single company or battalion-size unit. Certainly these assets are critical and should be managed accordingly. In the offense as well as in the defense, the attack company affords the division commanders the ability to move a great deal of firepower rapidly to the decisive point on the battlefield. They would not want to commit those assets to a lesser operation that would jeopardize that flexibility. But what if a division commander felt that moving an infantry unit by helicopters to secure a key piece of terrain (dam, bridge, built-up area, etc.) could be that decisive action? Then how can we in the attack helicopter business aid in increasing those odds for a successful mission?

Once it is determined that attack helicopters are necessary to support the air assault task force, a question that must be answered early on is, "Where do we get the attack assets and in what numbers?" If the air cavalry is tagged, the squadron or troop could be used, if not already committed to one of their many missions. But more than likely the assets will come from the attack helicopter company. And if so, will the entire attack company be needed? FM 17-50 states, "Attack helicopters are nomally employed in mass—preferably in battalion strength, but NOT LESS THAN COMPANY STRENGTH." The number of aircraft would depend on the nature of the mission. But as an example, a lift consisting of 4 to 10 assault aircraft could be escorted by as little as an "attack team," consisting of 3 scout and 5 attack aircraft. It is essential that once the assets are identified, the liaison officer (LO) be in on the planning as early as possible. The LO, like the other members of the task force planners, needs to analyze the METT + T (mission, enemy, troops, terrain + time) factors to ensure optimum employment and effective coordination.

The four phases of movement in an air assault operation that must be considered when planning for the effective use of the attack assets are:

- Helicopter movement to the pickup zone (PZ).
- Movement from the PZ to the release point (RP).
- Movement from the RP to the landing zone (LZ).
- Movement from the LZ back to the assembly area, subsequent lifts or another mission.

It can be assumed that the PZ is secured, unless the mission is an extraction of a unit under fire, and then the use of all fire support elements is essential. Depending on the mission and the location of the PZ, FM 90-4 states, "During air movement to the PZ, enemy antiaircraft or other fire may be encountered." If that is a concern, then the attack or cavalry aircraft should link-up with the troop-carrying aircraft at their assembly area and precede them to the PZ. But in most cases, the attack aircraft will link-up in the vicinity of the PZ. The attack/cavalry aircraft should not land on the PZ, and if the aircraft will be in the area for an extended period of time, they should occupy holding areas nearby.

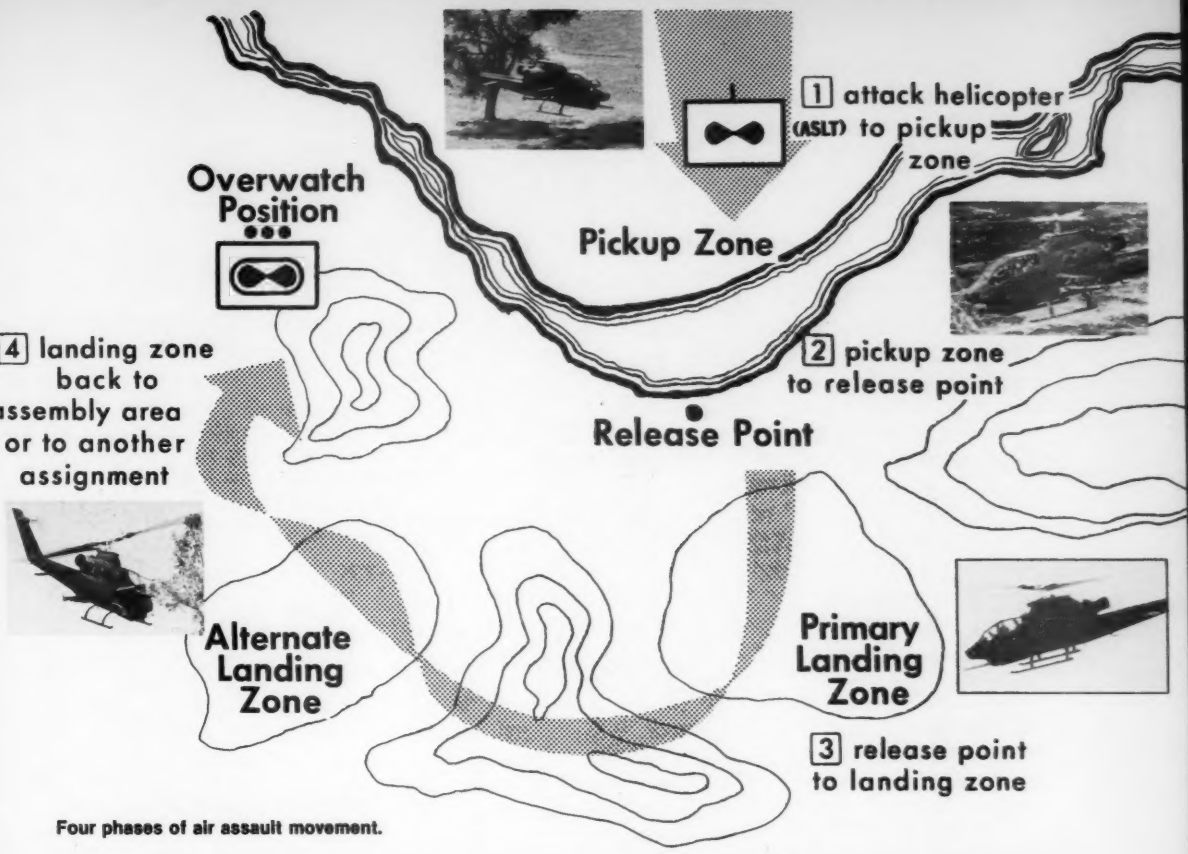
It is critical during the movement from the PZ to the RP that the attack/cavalry team precede the troop-carrying aircraft. In this manner, the team will attempt to locate and suppress enemy positions prior to the arrival of the formation. Caution must be exercised to ensure "telegraphing" the assault aircraft's route to the enemy *does not* occur. The positioning of the attack aircraft on the flanks of the assault aircraft's formation is of equal importance. The attack aircraft should be placed in such order that the lead aircraft of the flight is provided cover while still being in a position to quickly respond to the call of any assault aircraft in the flight that is taking fire. During this phase of movement it is essential that the maximum use of preplanned artillery fires and close air support are made available (range and weather permitting).

The movement from the RP to the LZ and disembarking of the troops is the most time-sensitive and critical phase. If the LZ is behind enemy lines or is in an area where enemy troops are suspected, alternate LZs must be selected, and the troop-carrying aircraft should not land at any LZ that has not been reconnoitered by an attack/cavalry team(s). Again, caution must be exercised to ensure that the reconnaissance is not premature and does not thereby divulge the location of the intended LZ to the enemy. This can be accomplished by reconnoitering both the primary and alternate LZs. It ensures the absence of the enemy, and if observed, keeps the enemy guessing as to where the landing will occur. The recon should be conducted only minutes before the arrival of the assault aircraft, and once completed the attack/cavalry team should reposition itself to an overwatch position which provides optimum intervisibility with the LZ and use of the maximum effective range of the aircraft's weapon systems (see figure 2). From the overwatch position, the attack/cavalry team can provide an assortment of key support functions. FM 90-4 suggests the following roles:

- Provide suppressive fires to prevent a time gap in LZ preparation by other support elements.
- Recommend last minute changes regarding aircraft landing instructions.
- Provide area cover and neutralize known enemy positions, or provide security for troop-carrying aircraft while in the LZ area.
- Provide command and control between the ground commander and the assault aircraft pilots arriving and departing the LZ.

Once the determination has been made that successful landing by the troop-carrying aircraft can be accomplished, and the approach is initiated, the attack aircraft escorting the flight can opt to relocate to an overwatch position or establish a "race track" flight pattern around the LZ.

During the final phase of movement, the attack/cavalry team will accompany the assault aircraft back to a predesignated point and terminate the mis-


1 attack helicopter (ASLT) to pickup zone
Overwatch Position
Pickup Zone
2 pickup zone to release point
Release Point
4 landing zone back to assembly area or to another assignment
Alternate Landing Zone
Primary Landing Zone
3 release point to landing zone

Four phases of air assault movement.

sion, or, if there are subsequent troop lifts, repeat the procedure. If the troops in the LZ require fire support, the attack/cavalry team may continue its support from the overwatch battle position while the assault aircraft return. Additionally, if the mission is a raid, the attack/cavalry teams as well as the assault aircraft may laager in a predesignated area near the LZ or objective.

There are two additional elements which will enhance the mission accomplishment and increase the survivability of the aircraft. They are conducting air assault operations in periods of darkness or limited visibility and the incorporation of a feint or false insertion(s) during the execution of the operation. Both of these techniques aid in confusing the enemy and will complicate his decisionmaking.

When attack helicopters are conducting armed escort, as in any attack helicopter mission, the ordnance configuration will vary, and a word of caution is in order when selecting the amounts and types to carry. A unique capability of our current attack helicopter is that it has a diverse array of weapon systems. From the quick-reacting 2.75 inch rocket area fire weapon, to the pinpoint precision of the tube launched, optically-tracked, wire-guided (TOW) missile and the instant response of the 20 mm cannon, the Cobra can cover virtually "all the bases." They should be configured so the pilot has the flexibility to select the best weapon to neutralize the threat. Furthermore, if 2.75 inch rocket pods are hung on the outboard articulating pylons, the aircraft is effectively lost as a tank killer for a considerable period of time until the TOW missile launchers are replaced and boresighted.

So, attack helicopters in the escort role? Yes indeed! And it is really nothing new. But that should not be taken as "carte blanche" for anyone planning an air assault operation. Remember, attack helicopters are a limited asset which are best used when employed against armored and mechanized forces in a combined arms effort, at the decisive time and place to achieve victory. After all, a light infantry division has only one attack helicopter company, and even with an 80 percent availability rate, the division commander's "trump card" amounts to only 17 aircraft.

Air Support for the Corps of Engineers

photo by Gary Dill

The U.S. Army Electronic Proving Ground-Aviation Division at Ft. Huachuca, AZ, provided the Corps of Engineers with an OV-1D Mohawk and crew for flood surveillance. The Mohawk was used to map the extent of flooding, locate seepage under the levees and survey the District for flood damage.

Mr. George E. Halford
Public Affairs Office
Vicksburg District, U.S. Army
Corps of Engineers
Vicksburg, MS

DURING THE recent flood emergency in Mississippi, Louisiana and Arkansas, the Vicksburg District of the U.S. Army Corps of Engineers found it necessary to call on other branches of the Army for assistance.

Responding to the emergency by supplying aircraft and crews were the U.S. Army Electronic Proving Ground-Aviation Division at Ft. Huachuca, AZ, the 121st Army Reserve Command (ARCOM), and Detachment Three of the 327th Aviation Group of the U.S. Army Reserve.

The 153d Attack Recon Squadron of the 186th Attack Recon Group of the Mississippi National Guard stationed at Key Field, Meridian, MS, offered its technical expertise to develop high altitude photographs of the flooded region.

Ft. Huachuca provided the District with the services of an Army OV-1D Mohawk, which was flown by Captain James R. Young. The OV-1 was used during the April 1983 flood of the Pearl River in Slidell, LA. The Waterways Experiment Station in Vicksburg had been using the craft and offered its services to the District.

When the Pearl went above flood stage again in May, with the Mississippi rising rapidly, the District requested use of the Mohawk again to use the airborne radar for checking the delineation of the flood area. Delineation indicates where the water meets land and helps mark the boundary of the flooded area.

The radar was augmented by the use of the photographic and infrared systems. The crew took high-resolution black and white photographs of the areas, then used the radar for comparison.

According to Sergeant First Class David Dorschner, operator of the surveillance equipment aboard the Mohawk, the Corps also used false color infrared photography. He explained that false color photography "is multicolored. All natural foliage will appear red because it has cholorophyl, while water and unnatural things will appear in different shades of gray to black. This makes it easy to see the water, especially in areas where there are a lot of woods around."

The Corps also took advantage of the craft's infrared line scan system. "It's not a camera. It has detectors to pick up heat emissions and amplify them," SFC Dorschner said.

The system can be set up to read either heat or cold. During the day the water is cooler than the surrounding surfaces and at night it would be warmer. "Basically, it makes the water easier to see," SFC Dorschner said. The infrared line scan is shot at the same scale as the black and white photos for comparison.

The black and white film was developed by the 153d Attack Recon Squadron. SFC Dorschner contacted Chief Master Sergeant James Barnhill, who runs the photolab for the 153d, because "he knew they could do the job."

The Mohawk flew directly to Meridian to get the film processed at the end of each mission and waited to return the processed film back to Vicksburg.

The high-resolution black and white pictures were instrumental in

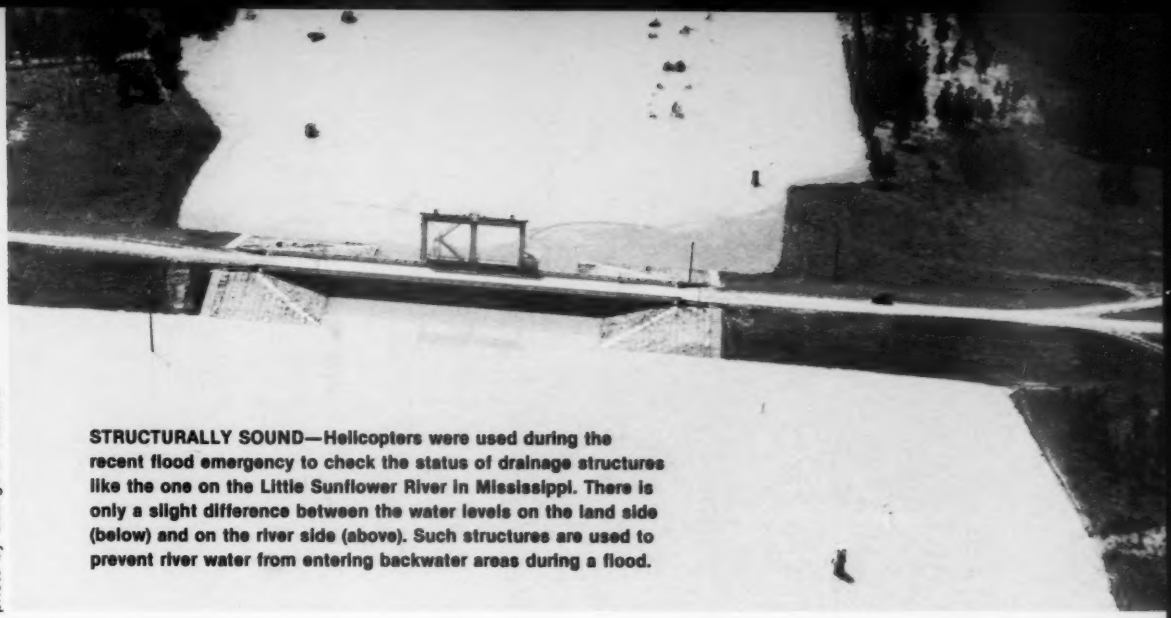


photo by George E. Halford

STRUCTURALLY SOUND—Helicopters were used during the recent flood emergency to check the status of drainage structures like the one on the Little Sunflower River in Mississippi. There is only a slight difference between the water levels on the land side (below) and on the river side (above). Such structures are used to prevent river water from entering backwater areas during a flood.

locating breaks in minor levees along Ascalmore and Pelucia Creeks in northern Mississippi. The break in the Ascalmore Creek Levee was not accessible by land.

The Mohawk's infrared line scan was also used to locate seepage under the levee.

The aircraft flew nearly 40 hours for the District during April and May, with the May flooding accounting for more than half that time. The missions included patrolling the entire length of the Pearl River from Jackson, MS, to the Gulf of Mexico, and the levees along the Mississippi, and surveying the extent of flooding.

Though the Mohawk gave a high-altitude overview of the flooding, a closer, farther reaching study of ground conditions on a day-to-day basis was also necessary. For this, the Corps used the helicopters and personnel of the 121st ARCOM Army Flight Activity 156, and Detachment Three of the 327th Aviation Company, the Vicksburg reserve unit to which the OH-58A Kiowa and UH-1H Huey helicopters were assigned. Department of the Army Civilian (DAC)/Captain Joseph D. Smith and DAC/Chief Warrant Officer David K. Farlow are on permanent full-time duty flying air support for the Army Reserve. Other pilots needed to fly this mission for the Corps were brought from within the 121st ARCOM.

The helicopters were used to patrol levees, inspect flood control structures and survey flooded areas for damage assessment. However, most of the flights involved levee inspection, where the advantages of the helicopter over ground travel or flight in fixed wing aircraft are evident.

On one levee inspection flight, the helicopter pilot and Corps employees spotted two youths in a boat being swept toward the main channel of the Mississipi River by flood waters. By alerting authorities to the emergency and reassuring the boaters, the helicopter crew and passengers were instrumental in accomplishing the rescue.

One of the advantages of helicopters is the ability to land on levees and pick up passengers, such as levee inspectors. An inspection trip that would take three men half a day to complete on the ground can be conducted by one man in a helicopter in a couple of hours. In addition, the helicopters provide a wider area of observation than is possible at ground level.

It is easier to spot sand boils from the air because they are not hidden by vegetation. A sand boil marks a place where water seeping under a levee erodes levee materials.

The helicopters were also used for aerial photography and to gain access to areas inaccessible from the ground.

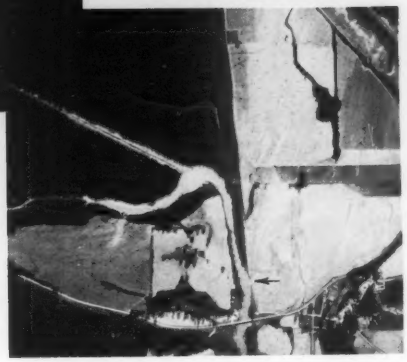
Not all of the flights must be emergency related or connected to the immediate flood fight. Because the helicopters often give employees a new perspective of a project, an aerial inspection of projects often results in new ideas or improved methods which result in monetary savings to the U.S. Government. All of this adds to the cost effectiveness of using the helicopters.

Not having full-time access to the helicopters is a major problem. To gain access to the Reserve helicopters, the District must enter Phase One emergency, which differs from area to area according to readings on the river gauges.

Cooperation with the Corps was also beneficial to the pilots and ground crews. "The biggest thing we got out of it was being able to use our experience for a purpose,"

photo by George E. Halford

STILL HOLDING—The Corps used the helicopters to fly levee inspections along the Mississippi River. Here, a mainline levee along the old river bed protects cultivated farmland at Point Pleasant, LA, from serious flooding.



LOOKING DOWN—This photo, taken from the OV-1D Mohawk at about 8,000 feet, shows a break in the levee on Black Creek in Holmes County, MS (note the arrow). This view also makes it easier to see patterns of old creek beds in the wooded area.

CPT Smith said. "It gave us a chance to use our training in a real-world situation."

However, CPT Smith added that the ground crew did all of the hard work. "It requires a 110 percent effort from all the people on the ground to maintain the aircraft. It couldn't have been done without them; they made the mission successful to this point." He added that the 121st Headquarters had been very supportive, giving the pilots the go-ahead to do whatever was necessary. CPT Smith said he enjoyed the smooth working relationship with the Corps, and appreciated the "feeling of satisfaction from doing a meaningful job."

District personnel described the people of the 121st as "true workhorses doing an outstanding job." Several times the pilots were required to spend 7 out of 8 hours in the air. Over a 2-week period, the unit flew more than 130 hours for the Corps.

This year's flood was not the first time aircraft had been used to support the efforts of the Corps in a flood fight. National Guard helicopters were used to survey damages in the Monroe, LA, area during Christmas week 1982.

The Flood of 1973 was the first time that the Vicksburg District used helicopters extensively during a flood fight, said Sam Hernandez, who coordinated emergency operations. At the time, the Army brought in helicopters from Ft. Benning, GA.

The Corps also uses aircraft for purposes other than flood fighting. Such was the case at the dedication of the Tensas National Wildlife Refuge in northern Louisiana.

Eleven UH-1H Hueys from Ft. Polk, LA, commanded by LTC Harry McCloud, flew dignitaries and newsmen from Monroe to the Tensas Refuge in early November for the dedication ceremony. Among the dignitaries were a U.S. Senator, Congressman, the Governor of Louisiana, both the Division and District Engineers from Vicksburg and a representative from the Department of Interior.

Whether the situation involves estimating flood damage, locating trouble spots in the levees or transporting dignitaries to a dedication site, the Vicksburg District has discovered the advantages of air support from Army helicopters.

BROWNOUT

THE HAZARDS TO AIRCRAFT operations from blowing dust and sand will never have to be explained to the pilot who has been caught in "brownout" conditions, whether caused by nature or created by his own or other aircraft.

FM 1-202, "Environmental Flight," dated 23 February 1983, warns aviators against taking off in sand or dust storms and advises against flying through such storms when possible. Dust and grit in the air will cause considerable damage to internal engine parts, excessive bearing wear and erosion of rotor blades.

When operations are necessary where sand and dust are a problem the aircraft should be airborne as quickly as possible. A running-type takeoff is recommended for fixed-wing aircraft and wheel-equipped helicopters. A maximum performance takeoff should be made in helicopters with skids. Rapid takeoff will help avoid loss of visual reference and damage from dust and sand to the engine and flight control system.

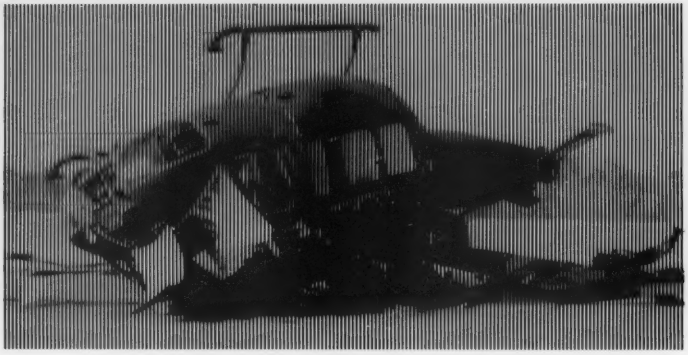
Procedures for landing emphasize that the best way to minimize blowing sand and dust is to make a running landing or if terrain does not permit a running landing, an approach to touchdown should be made. A landing should not be made to a hover. Once committed to landing, the pilot should land as quickly as possible.

When operation in sand cannot be avoided and a running landing is not possible, landing should be made using an approach angle that is greater than the angle used for normal approaches. The approach angle should be compatible with available power. If a running landing can be made, the touchdown roll should be kept to a minimum to prevent the possibility of overloading the landing gear.

Crews are cautioned to keep all doors and windows on the aircraft closed during landings and takeoffs to prevent sand from entering the cockpit and cargo area. Hovering and low-altitude, low-speed flight modes should be avoided whenever possible.

Although FM 1-202 addresses desert operations, brownout can occur anywhere there is loose or sandy soil, little or no vegetation, and periods of low precipitation. Strong winds, heavy use by vehicles, and operation of aircraft in such areas compound the problem. Because some of these factors are usually present, the possibility of brownout during field training exercises is extremely high. Mission briefings should contain a warning about the potential for brownout, but in spite of precautions even experienced aviators sometimes do dumb things and are involved in accidents that simply never should have happened.

One such pilot had been warned of possible brownout conditions during a mission briefing for a false troop insertion at a drop zone. He had 500 rotary wing flight hours,



more than 400 of which were in the UH-1H which he was flying for the night training mission. His aircraft was one of four involved in the mission. Flying the lead helicopter, he lined up with a dirt road running through the drop zone. When he had descended to approximately 8 feet above the ground, the rotorwash began picking up sand. The copilot commented to him about the brownout warning but the pilot replied that he wasn't concerned about dust and continued his approach.

He terminated the approach with a 1-foot hover and the resultant blowing dust caused him to lose visual reference with the ground. The aircraft drifted and the right skid hit the ground. It then yawed left and rolled to the right about the horizontal axis of the right skid, causing the main rotor to strike the ground. **The Huey came to rest on its right side.**

Pilots sometimes involve their aircraft in brownout conditions when an alternative is readily available. An OH-6A pilot made his first mistake when he selected a parking area for his aircraft close to an unimproved trail which ground vehicles had been using for two days. The trail had deteriorated to the point that a dense cloud of dust was generated when it was subjected to rotor downwash. He had used this same spot for two days during daylight hours without experiencing full brownout conditions. But on the night of the mishap, he failed to initiate a full performance takeoff and was mentally unprepared for the total loss of outside visual reference when he encountered blowing dust upon liftoff. He then turned on his landing light and reflected glare from the dust further reduced visibility. He turned the landing light off but instead of landing or making a maximum performance takeoff, he sustained the hover for about 20 seconds. **The aircraft drifted into a tree and crashed on its left side.**

The far-reaching effects of dust and weather on the success of helicopter operations are apparent in the following sequence of events.

On 24 April 1980, after 5½ months of planning, eight RH-53 helicopters took off from the aircraft carrier Nimitz. Their mission—**rescue of the American hostages in Iran.** A minimum of six helicopters would be required to complete the operation. In the first stage of the highly secret operation, the helicopters would travel 600 miles at low altitude to a preselected refueling site called Desert One. Two hours after takeoff, helicopter No. 6 began showing indications of rotor blade failure. The aircraft was landed and a decision was made to abandon it.

And then there were 7. One hour later, the formation unexpectedly encountered a dust cloud of unknown size and density. The helicopters broke out of the first area of suspended dust but, within an hour, entered a second, larger and denser area. While attempting to navigate through this second area with severely degraded visibility, a second helicopter (No. 5) experienced a failure of several critical navigation and flight instruments. The progressively deteriorating flight conditions made safe flight extremely questionable and the helicopter pilot decided that it would be unwise to continue. He aborted the mission, reversed course, and recovered on the Nimitz.

And then there were 6. The remaining six helicopters arrived at Desert One for their refueling rendezvous with the C-130s. The formation had been separated in the low visibility of the dust storm and they arrived from 50 to 85 minutes later than planned. While en route, a third helicopter (No. 2) experienced a partial hydraulic failure, but the crew elected to continue to the refueling site believing repairs could be accomplished there. Upon landing, however, the crew and the helicopter unit commander concluded that the helicopter could not be repaired.

And then there were 5. In the planning stages of the rescue mission, it had been determined that a minimum of six operational helicopters would be required at the refueling site to transport the rescue teams and bring the hostages safely out. The decision was made, and concurred in by the President, to abort the rescue operation.

(As the force began preparing to withdraw and return to launch base one helicopter was being

repositioned to permit another to top off its fuel tanks for the return flight. The first helicopter collided with one of the refueling C-130s and both aircraft were immediately engulfed in flames in which eight crewmembers died and five other members of the team were injured.)

The Special Operations Review Group commissioned by the Joint Chiefs of Staff to conduct a broad examination of the Iranian hostage rescue mission consisted of six senior military officers—three retired and three still on active duty. For the purposes of this article only one aspect of the group's findings will be addressed—helicopter No. 5.

Little information was available about weather which could be expected along the 600-mile route to the desert refueling site. Because operational security was absolutely vital to the rescue mission, no weather reconnaissance flight over the route was attempted. Adequate weather information can be denied to Air Weather Service meteorologists in several ways: (1) a closed society (such as Iran) does not release information (2) the weather phenomenon can be so infrequent that it has never before been observed in recorded history (e.g., Mount St. Helen's ash) or (3) the area of interest may be so sparsely populated that although the phenomenon occurs frequently, and perhaps predictably, it is not observed by "civilized" inhabitants and therefore is not recorded. The suspended dust encountered along the helicopter route falls more appropriately into the third category.

The helicopter force unexpectedly encountered visibility conditions which precluded visual meteorological conditions (VMC) flight approximately 3 hours after takeoff from the Nimitz and flight integrity was lost. The helicopters broke out of the first area of suspended dust but soon entered a second one, which was of even greater density.

The force was maintaining strict radio silence and helicopter No. 5 was not in visual contact with the other aircraft. The commander of No. 5 had not been told—nor did he ask—about the weather conditions at Desert One. Based on instrument malfunctions on his aircraft, exacerbated by the visibility conditions, he made a decision to abort and return to the carrier. (If he had continued toward Desert One, he would have exited the instrument meteorological conditions (IMC) in approximately 25 minutes—and in 55 minutes would have arrived at his destination.)

When questioned about what his decision would have been if he had known that the restricted visibility conditions did not prevail at his destination, the pilot indicated that he would have continued the flight. His failure to arrive at Desert One proved critical in that one additional mission-capable aircraft would have permitted the entire mission to continue.

The review group believes that direct interface between mission pilots and air weather officers would have increased the likelihood of foreknowledge of the suspended dust phenomenon and that pilots encountering the suspended dust would have been better prepared to make a decision when they were caught in the dust storm.

Chances of an encounter with weather phenomena such as volcanic ash from the Mount St. Helen eruption are slim, but it can happen. The unexpected nature of such an incident can contribute to the danger posed to aircraft.

This was the case when the captain of a British Airways flight found himself piloting a 290-ton Boeing 747 with 262 lives on board and no power! The aircraft was 120 miles from the nearest airport at Jakarta, Indonesia, when all four engines suddenly failed.

The best hope for survival lay in a long glide back to Jakarta while attempting to restart the engines—but a 10-thousand-foot mountain range was between the airliner and the airport. The huge aircraft continued to lose altitude as efforts to restart the engines met with no success. Just short of having to attempt to ditch in the sea, the first engine finally roared back to life, followed by the other three. Inspection revealed that the aircraft had flown into a cloud of ash from a volcanic eruption and all engines had been snuffed out.

With luck, your experiences with brownout from dust (or whiteout from snow in winter) won't be as earth-shaking as these last two examples. Good judgment can keep you out of situations like those involving the Huey and the OH-6. Sometimes you will have to operate in areas where dust is a problem but look for alternatives and use them whenever you can. When there are no viable alternatives, follow the procedures in your operators manual and the field manual. Avoiding brownout is a lot better than finding yourself trying to fly "blind" in a cloud of dust.

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Browne, Peter "We've Lost All Four Engines!" *Reader's Digest,* June 1983.

U.S. Department of Defense. *Report on Iran-Rescue Mission.* Prepared by Special Operations Review Group for Joint Chiefs of Staff. *Aviation Week and Space Technology,* September 15, 22 and 29, 1980.

Brenda Sando
photograph by
Reflections Studio

PEARL'S

Personal Equipment And Rescue/survival Lowdown

ALSE MOSs

We have not forgotten the critical need for the career aviation life support equipment (ALSE) military occupational specialties (MOSs), but we need your support in the form of task and skill analyses to help develop the MACRIT (Manpower Authorization Standards and Criteria) we need to send to Military Personnel Center. We will write the necessary justification, but we need your data. We will coordinate all actions through the ALSE Management Steering Council. This council is a strong, unbiased panel that gets things done.

Credit—Where It Is Due

A few years back we frequently heard of the good things that a very strong ALSE supporter was doing. Yes, Dave Klindt formerly of the UASSB, Schwaebisch Hall, Germany, certainly did an outstanding job in "selling" ALSE. We're thankful that his replacement (CW4 Charles "Chuck" Gibson) is also a very strong supporter of this critical area. Since the inception of this ALSE element in the UASSB, Europe, and the concern for well trained personnel, the combined effort of Dave Klindt and Chuck Gibson has paid off to the tune of some 820 aircrew people who are now qualified and knowledgeable in ALSE. A majority of these people are high ranking warrant officers, as well as a number of commissioned officers. Many enlisted soldiers have participated, including E8s. So we have a viable program going which truly needs a career military occupational specialty (MOS) or MOSs. Let PEARL hear from you in the field; we will carry the ball to Military Personnel Center (MILPERCEN) to get you those MOSs.

The Ladies Are Getting ALSE Trained

Our latest Army lady is SGT McKinney, 348th Medical Detachment (HA), 10730 South Florida Drive, Orlando, FL 32812. SGT McKinney recently was graduated from the U.S. Air Force Aviation Life Support Equipment School, Chanute AFB, IL. She is a 76P and has been assigned to the 348th Medical Detachment as the ALSE noncommissioned officer in charge. Welcome aboard, SGT McKinney; we look forward to great things happening for ALSE in your unit.

DARCOM (ALSE) Project Officer (PO)

Aviation life support system equipment training is on the upswing. The Fifth U.S. Army just completed another course in which a number of high level personnel, both military and civilian, participated.

DARCOM ALSE Training For Staff and Users

The recent session of the DARCOM ALSE training school was concluded and again there were high level interest and personnel in attendance, showing they are concerned and are being trained in this critical field. We are planning to establish this training to be conducted as a minimum twice each year. We're also formalizing the training and are working closely with the Fifth Army and other Army elements, the Army National Guard and Reserves to ensure we standardize this training.

Special Measurement Form

All requests for Special Measurement Clothing for Men, DD Form 358, submitted to DPSC-M must contain the height and weight of the person being fitted. Requests without this information cannot be processed. Continue to use DD Form 1111 for women. In all cases you must indicate the height and weight, whether it is for men or women.

Supply Information Letter

The U.S. Army/TSARCOM Supply Information Letter No. 1-83, April 1983, published by the U.S. Army Support Activity, Philadelphia, 2800 South 20th Street, Philadelphia, PA 19101, has recently been published. Copies are available by writing to the above address, ATTN: STSAP-G. Information pertaining to support equipment (ALSE) is extracted for your perusal.

Body Armor, Small Arms Protective, Aircrewman, Front Torso and Front/Back Torso. Assets of the

assembled items in sizes short, NSNs 8470-00-935-3183/3192 and regular, NSNs 8470-00-935-3184/3193 are exhausted. Requisitions received for these NSNs will be rejected with status code "CK." Assets are currently available for size long only, NSNs 8470-00-935-3185/3194. Army activities authorized subject body armor should requisition out-of-stock sizes by available components and assemble the item.

SIZE	VEST	FRONT PLATE	BACK PLATE
Short	8470-00-999-1473	8470-00-935-3177	8470-00-935-3174
Regular	8470-00-999-1474	8470-00-935-3178	8470-00-935-3175

Chemical Protective Clothing Laces. DPSC is accepting requisitions for footwear laces for use with the chemical protective footwear cover, NSN 8340-01-021-5978. The laces are black nylon, flat, braided, tipped on both ends, 7/32 of an inch wide and 84 inches long. NSN 8335-01-107-6998, laces footwear, pair $.31.

Socks, Extreme Cold Weather. The socks are to be worn with boots, ECW, mukluk and serve as a liner for maximum insulation effectiveness. CTA 50-900, Note 147 authorizes "1 pair per authorized boots, ECW." The socks *are not* listed in CTA 50-900 as a separate item of supply, but as a component of the boots, ECW, mukluk. LIN CO8274 applies to both the socks and boots, ECW. Point of contact is Vickie Domenico, AUTOVON 444-2535.

Chemical Protective Overgarment. Stocks of subject item for sizes XXXS, NSN 8415-01-070-1880 and XXS, NSN 8415-01-070-1879, are exhausted. Further procurement of these sizes is pending adoption of the new battledress overgarment. All requisitions routed to DPSC (S9T) for these sizes will be rejected with status code "CA." Size substitutions should be used where possible.

Mountain Piton Snap Link. There have been several instances recently of snap link failure due to improper rapelling technique. Improper technique was used in lacing the rope through the snap link. We in Army Aviation are using this snap link for rescue purposes, but use two snap links so we should not be faced with the mountain or helicopter rapelling problem. But do be sure you use *two* snap links when wearing the SRU-21/P modified survival rescue vest.

Visor Tracks. The Army Support Activity issued a message R251530Z May 83 which furnishes pertinent changes for the visor tracks and earcup retention assemblies for the SPH-4 helmet. Due to unsatisfactory performance, visor track, NSN 8415-01-083-8372 (interchangeable), will no longer be issued. Visor track, left hand, NSN 8415-00-410-4669 and right hand, NSN 8415-00-410-4668, have been reinstated as the standard items of issue. DLA assets are available for both left and right hand track. Interchangeable visor tracks currently in use should be replaced at the next 90-day inspection or at the earliest possible time.

Earcup Retention Assemblies. Item was previously available in two sizes. The Army adopted a standard size retention assembly, *NONSIZED,* NSN 8415-01-056-0699, SZ XL, which is being phased out. DLA assets will be issued until exhausted. NSN 8415-01-056-0700 SZ Reg. for which DLA assets have been exhausted, is being retained as the NSN for the nonsized standard item. Description data is being revised. All requisitions currently on backorder for NSN 8415-01-056-0700 will be supplied with the standard nonsized item, when available. Point of contact is Ms Gerry Lyles, AUTOVON 444-2537.

ALSE Revisited

While browsing through a technical magazine published in early 1938, PEARL came across an article on, guess what? Yes, would you believe an article on "Emergency Locator Transmitter." For the benefit of all concerned, we are quoting from this article: "Enclosed in a fireproof box, the miniature battery operated transmitter is designed to be mounted on coil springs within the tail of a plane. A severe jolt closes a switch that sets the little black box in operation for 4 days. The set will continue to send out short wave signals without interruption. This will allow ample time for search aircraft with direction finding equipment to locate the crash site." This article appeared November 1938. The subject of the ELT has been around for a long time, but its need is being recognized. Support for the personnel location system (PLS) is rapidly advancing. The letter requirement has been signed off and actions in this area will be increasing. Now with the PLS we will have something to locate that "downed aircraft/aircrew." The PLS will play an important role when we finally see the new AN/PRC-112 survival radio.

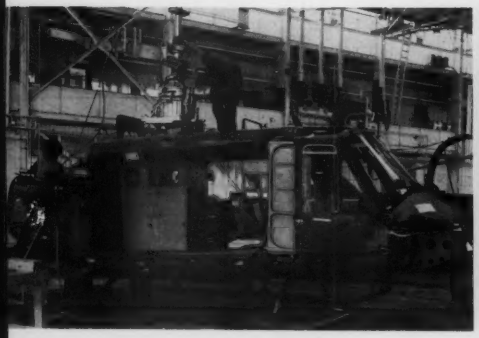
If you have a question about personal equipment or rescue/survival gear, write PEARL, DARCOM, ATTN: DRCPO-ALSE, 4300 Goodfellow Blvd., St. Louis, MO 63120, or call AUTOVON 693-3307 or Commercial 314-263-3307.

Warrant Officer L. J. Simone
Red Baron Program Coordinator
Corpus Christi Army Depot
Corpus Christi, TX

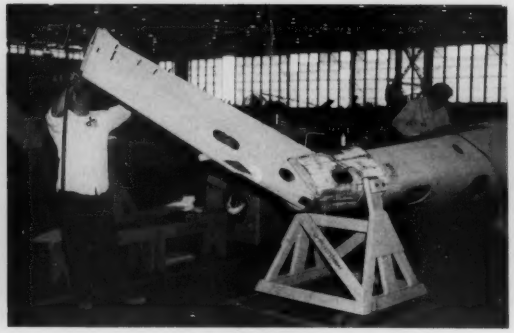
CORPUS CHRISTI ARMY DEPOT

The **Beginning** and **End** for Army Helicopters

It's often hard to convince crews that the depot does not produce new aircraft; it only...



...disassembles them...



...overhauls them...

...repairs t

THE TIME HAS come for your aviation unit to turn in a "seemingly" perfect helicopter to Corpus Christi Army Depot (CCAD). You've been scheduled to turn it in and pick up a freshly overhauled one in return. You're confused. Why?

So starts another long industrial process at CCAD which was established in 1961. Completion of a helicopter life cycle under the on condition maintenance (OCM) program keeps the Army utility, attack and observation helicopter fleet alive, well and flying.

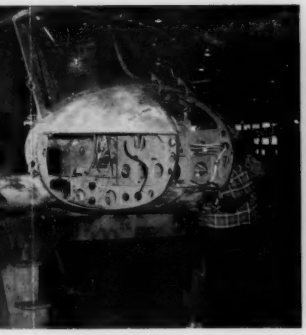
The overhaul and repair business at the depot is healthier and more successful than ever. CCAD, which is under the command control of the U.S. Army Depot System Command (DESCOM), Chambersburg, PA, is located in the south Texas Gulf Coast region on a naval air station. It took Texas and the naval air station as its home because of their availability and accessibility when the Navy Airplane Rework Facility was closed in 1960.

The depot complex of 130 acres, employing more than 3,000 civil service employees and 30 military, in 1982 processed more than 500 aircraft encompassing 14 different types, from Turkey to Korea—Alaska to Panama. Impressive? You bet! However, the depot process may be confusing to many. It is easier to understand if you are fortunate enough to be assigned as a military member. I am one such military member, assigned to the depot as a 67Z maintenance supervisor and formerly was noncommissioned officer in charge of the Aircraft Delivery Office.

I arrived at CCAD from Germany in 1979 and worked in a branch of the depot that receives aircraft arriving for repair or overhaul and leave the depot once they are completed. The job is unique since any ferry crew coming through CCAD must pass through the office. The Aircraft Delivery Office initially receives the crews and explains the depot process and often conducts tours to point out the maintenance and logistic process that the helicopter will go through. Crews from almost every state and most aviation organizations, to include Reserves and National Guard, pass through the office. Each crew is amazed to find out what happens to an aircraft during its overhaul process.

This process really begins with the commodity manager for helicopters at the Troop Support and Aviation Materiel Readiness Command (TSARCOM) in St. Louis, MO. The manager sends out a team of contracted technicians each year to inspect airframes on every helicopter. During the inspection (ACE—Aircraft Condition Evaluation), panels and structures are evaluated and assigned a score. Those aircraft assigned a higher score will be inducted for depot overhaul and the process of induction begins at the depot. From there, the aircraft candidate is managed by TSARCOM as to the date when it should be either flown, trucked or air shipped to the depot for overhaul. After coordination among the owning unit, TSARCOM, DESCOM and CCAD, arrangements for turn-in are formulated.

These arrangements are further processed within the depot's Production Planning and Control Division, as well as the Aircraft Delivery Office. This is the point where the depot assumes one of the more personal



airs them...

...reassembles them...

...and returns them.

roles in the depot system. By this I mean we are in contact with our stateside customers on the phone explaining any unanswered questions before the turn-in process begins. We also discuss the OCM aircraft being assigned, and finally schedule the dates to pick up the aircraft. Many ferry crews have questions about their aircraft configuration, modification work orders, radio systems and even the color and year of manufacture. We try to answer all these questions so the members of the ferry crews are in tune to what takes place before they arrive.

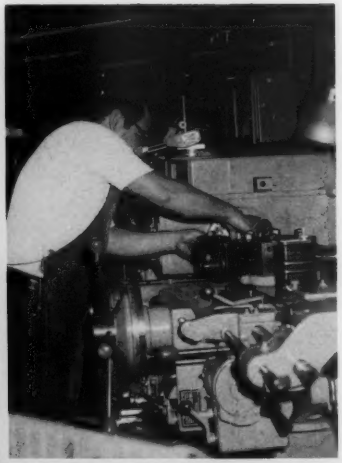
Once members of ferry crews arrive at the depot, the aircraft they are turning in are inventoried for completeness, records are checked for accuracy and personal items are removed. Next, the OCM aircraft are issued. The ferry crews are given the logbooks and they are provided with a DA Form 2404 to inspect the aircraft for any safety of flight items they may find. When the aircraft are inspected and inventoried and all questions answered, the ferry crews are given the ignition keys, the flight logs and a complete set of publications before signing for the aircraft. This is a 3- to-4-hour process.

Often during this transfer process the crewmembers are amazed to learn that they are receiving an aircraft that has more than 8,000 hours, or was in Vietnam with them or was in their last unit in Germany. Overall, they are impressed with the product and give our depot a good report card once they get home. It's often hard to convince crews that the depot does not produce new aircraft. CCAD only overhauls what is in the Army system—and that goes back to 1962 vintage aircraft, with some having more than 10,000 hours. Nevertheless, the crews generally report that "CCAD makes an old aircraft like new" once it completes its depot process.

This is another ongoing cycle that is repeated 300 to 400 times a year; and it's a process the depot is proud to say it "supports with pride."

But, once members of a ferry crew depart the depot, they normally forget what is about to happen to the helicopter they left behind. Within 2 days, the aircraft

The depot has machine shops for repair of engines such as T53-L13 engines (lower right).



is inventoried, shortages are noted, and the aircraft is defueled and preserved. Depending on the program and availability of funds, the aircraft waits in storage for induction into the maintenance processing cycle.

The first stage of maintenance is for the aircraft to begin its process of overhaul at the disassembly point where the aircraft is stripped down to wires and piping. Components are removed and routed to the many specialized prime shops for overhaul work. The airframe is cleaned thoroughly so inspectors can perform a thorough examination. From here, the airframe is repaired, as needed, with the aid of jigs and fixtures. The tailboom moves through the same sequence of events. Finally, after 60 work days, the aircraft is painted, fueled, weighed and flight tested. Logbooks, loose gear and a complete set of publications are added. The aircraft is now finished and ready for an assignment to almost any part of the world, ready to meet the demanding challenge of Army Aviation's mission.

TOP: 540 rotor hub assembly getting a final inspection. CENTER: A technician inspecting bearing parts. BOTTOM: A bearing technician checking bearing specifications.

FACTS AND FICTION ABOUT CORPUS CHRISTI ARMY DEPOT

1. CCAD produces new helicopters.
   FALSE: CCAD overhauls, modifies, repairs and/or repaints helicopters.

2. Helicopters leaving CCAD begin with zero hours on the airframe.
   FALSE: Helicopters that complete overhaul retain the continued airframe time—some airframes have accumulated 10,000 hours.

3. Military personnel can receive depot-level, hands-on training at CCAD.
   TRUE: Depot assistance training can be received at CCAD for 2 - to 4 - week periods by contacting the Depot SGM at AV 861-3771/3772. (Hands-on only.)

4. CCAD is manned by civilian personnel.
   TRUE: More than 3,000 civil service employees, as well as 30 active military people, comprise the depot work force. The commander is an Army colonel.

5. CCAD overhauls Army aircraft only.
   FALSE: Besides the Army, CCAD overhauls/repairs the helicopters for the Navy, Marines and some Air Force.

6. CCAD has a "Hotline" system for service centers.
   TRUE: Engine Hotline—(24 hours) AV 861-2651/2
   Supply Hotline—AV 861-2086
   Field Assistance Hotline—AV 861-2651/2/3
   Customer Complaint Coordinator—AV 861-2587

7. CCAD sends out maintenance crews to field units when needed.
   TRUE: The depot can send maintenance teams onsite to perform depot level repairs. Teams travel annually to most parts of Continental United States and many foreign countries and have proven to be a valuable asset to CCAD as well as to the unit aviation commander.

8. CCAD's only mission is to overhaul or repair aircraft.
   FALSE: Besides overhauling aircraft, CCAD has the mission of overhauling components such as tailbooms, 90-degree and 42-degree gear boxes, CH-47 gear boxes, turbine engines, bearings, component containers, and more. These components are controlled by the National Inventory Control Point at St. Louis, MO.

9. CCAD still operates its ship called the *Corpus Christi Bay*.
   FALSE: The famous *Corpus Christi Bay* was decommissioned following its term of service in the South China Sea off the Vietnam coast. Its memory still lives on, as many of the workers on the "flat top" are now civilian employees in the depot.

10. The UH-60 Black Hawk will someday be overhauled at CCAD.
    TRUE: CCAD will one day overhaul the UH-60. Preliminary planning has already begun in the depot, and the depot is expanding its facilities to accommodate the Black Hawk.

11. Helicopters required to go through overhaul are scheduled on an annual basis.
    FALSE: Helicopters that are required to be turned in to CCAD for overhaul are entered based on the ACE score. This score represents a profile of the condition of the airframe. The higher the score, the sooner the aircraft enters the overhaul program.

12. When an Army organization is notified to pick up a helicopter at CCAD, it has in most cases completed overhaul.
    TRUE: Most aircraft being picked up from CCAD have been overhauled; however, many aircraft are sent to CCAD only for minor repairs or for transfer inspection.

UH-1 Instructor Pilot Qualification

INSTRUCTOR PILOTS (IPs) are the cornerstones of our flight standardization program. For this reason, the U.S. Army is highly selective in choosing aviators to attend resident instructor pilot courses conducted at the U.S. Army Aviation Center, Ft. Rucker, AL.

These courses are designed to train, challenge and qualify selected commissioned and warrant officer aviators as unit instructor pilots for the conduct of transition/standardization training in Army aircraft. Instructor pilot courses require much study before, during and after course attendance.

This article provides information that will assist aviators who contemplate attending the UH-1 instructor pilot course (2C-ASI5K/2C-SQIC). The course title is: UH-1 Contact Instructor Pilot and it lasts 4 weeks (see figure, fiscal year 1984 schedule). To qualify you must:

- Be an Active Army or Reserve Component commissioned officer currently in Specialty Code 15A, 15B, 15C, 15M, 15S, 67J or 71A.
- Be an Active Army or Reserve Component warrant officer currently in military occupational specialty 100B, C, D or E.
- Be assigned to, or on orders to a unit equipped with UH-1 helicopters.
- Be current in the UH-1 and possess a current flight physical and rotary wing instrument rating, neither of which will expire during the course.
- Meet weight standards of AR 600-9.
- Meet all requirements of AR 95-1 pertaining to the award of an IP rating.
- Accept obligated service of 1 year, for active duty commissioned and warrant officers.
- Have a minimum of 500 hours of rotary wing time of which 250 hours are as pilot/copilot in the UH-1, or 250 hours as a rotary wing IP.

FY 1984 Schedule

Class #	Report Date	Finish Date
84-1	25 Oct 83	23 Nov 83
84-2	24 Nov 83	06 Jan 84
84-3	08 Jan 84	03 Feb 84
84-4	05 Feb 84	05 Mar 84
84-5	05 Mar 84	02 Apr 84
84-6	02 Apr 84	30 Apr 84
84-7	30 Apr 84	29 May 84
84-8	29 May 84	26 Jun 84
84-9	26 Jun 84	25 Jul 84
84-10	25 Jul 84	22 Aug 84
84-11	22 Aug 84	20 Sep 84
84-12	20 Sep 84	19 Oct 84

A security clearance is not required, but if you are selected to attend, the following records should accompany you: 201 file; Standard Form 88; and DA Forms 2, 2-1 and 759.

If you should not meet the requirements listed, you can request a waiver from:

Director
Department of Flight Training
ATZQ-T-FT-O
Ft. Rucker, AL 36362
AUTOVON: 558-2214/2188
Commercial: (205) 255-2214/2188

Course Description

The IP course consists of flight and academic training in day and night visual flight rules (VFR); UH-1 aircrew training manual maneuver tasks to include all before flight, basic flight, approach/landing, and emergency tasks; academic instruction and practical application of principles and techniques of flight instruction; academic instruction and practical application of UH-1 aircraft systems and maintenance subjects.

Sufficient depth of knowledge is gained to enable graduates to teach subjects in both flight and maintenance areas.

Academic subjects taught are designed to provide student IPs with a working knowledge of instruction fundamentals, flight regulations and rotary wing aerodynamics. Student IPs also receive familiarization and instruction in aircraft systems which provide background knowledge in UH-1 maintenance subjects. Included are UH-1:

- General information

- Power plant and related systems
- Power train
- Main and tail rotor system
- Weight/balance
- Performance planning
- Flight controls and hydraulics
- Electrical system.

The flight training portion of the course is based on 28 hours of flight instruction. However, on demonstrated proficiency the student IP may be graduated with fewer hours. Flight hours are applied as follows: Day 20.6 + Night 3.9 + SFTS 1.5 + Eval 2.0 = 28.0.

Aviators can enhance their performance in the course through prior study. They should become familiar with AR 95-1 with particular emphasis in the areas of safety, VFR and IFR flight planning and airspace requirements. They should study the Operator's Manual (dash 10) and know Chapter 5, Limitations, and Chapter 9, Emergency Procedures. Also, be familiar with weight/balance and performance planning.

Other areas you should study are:

- *TC 1-135:* Know the proper execution of all contact maneuver tasks.
- *FM 1-203:* Develop a working knowledge of rotary wing aerodynamics.
- *FM 1-301:* A light reading of this publication should be adequate.
- *AIMs:* Develop an understanding of airspace structure and requirements.
- *Instructor Pilot Guide:* A thorough reading of this publication is most beneficial since it's unique to instructor pilot status.

Once you've studied the aforementioned areas, get with your unit instructor pilot and allow him or her to assist you with additional flight and academic preparation.

Most important of all...stay motivated!

DES welcomes your inquiries and requests to focus attention on an area of major importance. Write to us at: Commander, U.S. Army Aviation Center, ATTN: ATZQ-ES, Ft. Rucker, AL 36362; or call us at AUTOVON 558-3504 or commercial 205-255-3504. After duty hours call Ft. Rucker Hot Line, AUTOVON 558-6487 or 205-255-6487 and leave a message

AVIATION PERSONNEL NOTES

Personnel Changes at MILPERCEN

We have had several changes to our MILPERCEN Aviation Team: Steve DeVault, Specialty Code 15 majors' assignments officer, was promoted to lieutenant colonel; MAJ Gary Steimle, majors' overseas assignments officer, has been replaced by MAJ Steve Raho; MAJ (P) David Hicks, lieutenant colonels' assignments officer, has been replaced by MAJ Joe Fucci; and Joe's replacement as professional development officer is MAJ Mitch Johnson. LTC (P) Bob Wolf replaced LTC Gene Grimsley in Colonels' Division.

NOTAM—Flight Pay Delay

Your flight pay could temporarily stop—even if you are in an operational flying duty position. When you reach a gate (and fail it) or when you reach 22 or 25 years of Total Federal Officer Service (whichever is applicable) your entitlement to *continuous* Aviation Career Incentive Pay ceases. Of course if you are performing operational flying duty you are entitled to monthly incentive pay. To preclude any lag between cessation of continuous incentive pay and commencement of monthly incentive pay, each commissioned aviator should notify the servicing military personnel and finance and accounting offices.

New Army Experimental Test Pilots

On 10 June four Army officers successfully completed the rigorous 11-month Naval Test Pilot School at Patuxent River Naval Air Station, MD. MAJ James A. Correia and CW3 (P) Roger P. Rensvold are now assigned to the Aircraft Development Test Activity, Ft. Rucker, AL. CPT (P) James S. Voss is now a student at the Armed Forces Staff College, Norfolk, VA, and CW4 James M. Adkins is now assigned to the Army Aviation Engineering Flight Activity, Edwards AFB, CA. Congratulations on a job well done!

The next selection board is tentatively scheduled for February 1984. Refer to DA Circular 351-82-5 for general information, prerequisites and application procedures.

Army ATC Training Materials

Mr. Roland Weldon
Course Development Division
Directorate of Training Developments
U.S. Army Aviation Center
Fort Rucker, AL

New Extension Training Materials Catalog

ATTENTION MOS 71P, 93H AND 93J PERSONNEL AND SUPERVISORS!

The extension training materials catalog, DA Pamphlet 350-101-3 (February 1983), has been published with a new look. The new version is bright red and titled "Air Traffic Control Battalion (CORPS), ARTEP 1-225." Its improved design provides a valuable and ready reference of materials needed to train common tasks, military subjects and military occupational specialty (MOS) technical tasks, plus it provides guidance on "how-to" obtain the materials. Copies of the new catalog may be requisitioned through your AG channels.

New Training Extension Course (TEC) Lessons

The new catalog has a listing of TEC lessons. However, there are 15 additional TEC lessons not shown in the listing. These were submitted in a correction to the new catalog and should be included in the next issue. Since work has been completed on these, they may already be in your TEC library.

The number and title for each of the additional lessons are shown below:

222-011-6231F	**Load and Unload Shelter, TSQ 71A**
222-011-6232F	**Position and Unpack Radar RT Group Trailer**
222-011-6233F	**Assemble Radar RT Group**
222-011-6234F	**Install Shelter to Trailer Cable, IFF Antenna and PU 678/G**
222-011-6235F	**Install Shelter Mounted UHF/VHF Antennas**
222-011-6236F	**Install Shelter Mounted FM Antenna, Shelter Sunshield and Vestibule**
222-011-6237F	**Install Telephone Lines and Miscellaneous Shelter Component and Ground Equipment**
222-011-6238F	**Installation Checks, TSQ 71A**
222-011-6245F	**Install Aircraft Control Central TSQ 70A, Part I**
222-011-6246F	**Install Aircraft Control Central TSQ 70A, Part II**
222-011-6247F	**Install Aircraft Control Central TSQ 70A, Part III**
222-011-6248F	**Install Aircraft Control Central TSQ 70A, Part IV**
222-011-6251A	**Facility Training, Part 2**
222-011-6254F	**Install and Prepare PU 619/M for Operation**
222-011-6257A	**Assign Beacon Codes**

More TEC lessons are on the way. Twenty-six are currently under development and should be fielded during 1984. A listing of these is shown below:

222-011-6258F	**Select Site for TSQ 97**
222-011-6259F	**Install TSQ 97, Part I**
222-011-6260F	**Install TSQ 97, Part II**
222-011-6261F	**Operate TSQ 97**
222-011-6262F	**Operate ARC 114 & 115 Radio Sets of the TSQ 97**
222-011-6263F	**Operate the RT-1167/ARC 64 Radio Set and Alimeter of the TSQ 97**
222-011-6264F	**Operate TSQ 97 Under Unusual Conditions**

222-011-6265F	Prepare TSQ 97 for Relocation
222-011-6266F	Relocating the TSC 61B
222-011-6267F	Install the TSC 61B, Part I
222-011-6268F	Install the TSC 61B, Part II
222-011-6269F	Assemble Antenna, TSC 61B, Part I
222-011-6270F	Assemble Antenna, TSC 61B, Part II
222-011-6171F	Assemble Antenna, TSC 61B, Part III
222-011-6272F	Perform Operator Maintenance on TSC 61B
222-011-6181F	Operate TSC 61B, Part I
222-011-6282F	Operate TSC 61B, Part II
222-011-6283F	Operate TSC 61B, Part III
222-011-6284F	Operate TSC 61B, Part IV
222-011-6285F	Perform Operator Preventive Maintenance on TSC 61B
222-011-6286F	Disassemble Antenna TSC 61B
222-011-6275F	Emplace and Perform Preliminary Operating Checks, TRN 30
222-011-6276F	Erect 15-ft Antenna, TRN 30
222-011-6277F	Erect 30-ft Antenna, TRN 30
222-011-6278F	Operate Beacon Set and Prepare for Movement, TRN 30
222-011-6279F	Perform Operator Maintenance on TRN 30

Army Correspondence Course Program

Change in Enrollment Eligibility. Eligibility requirements for enrollment in correspondence courses for MOS 93H and 93J, skill levels 2 and 3, have been changed so that a person who completes one can enroll in the other. For example, when a 93H1 or 93H2 completes the PTC for MOS 93H, he or she is then eligible to enroll in the PTC for MOS 93J. Reason for the change was a request from a field trainer who was running out of courses for his people. The affected courses are shown below:

- ☐ **Air Operations Primary Technical Course (MOS 93H). Skill Level 2, Course Number R-14.**
- ☐ **Air Operations Primary Technical Course (MOS 93J). Skill Level 2, Course Number R-34.**
- ☐ **Air Operations Basic Technical Course (MOS 93H). Skill Level 3, Course Number R-17.**
- ☐ **Air Operations Basic Technical Course (MOS 93J). Skill Level 3, Course Number R-37.**

New Correspondence Course. A new correspondence course, entitled "Air Traffic Control Duty Positions" is now available. The course consists of the following 6 subcourses totaling 26 credit hours: CTO (Control Tower Operator) Orientation, Flight Data, Ground Control, Local Control, Nonradar Approach Control and Radar Approach Control.

The course provides students with a working knowledge of rules, regulations and procedures required for air traffic control duties. The course also prepares personnel for the successful completion of the Federal Aviation Administration (FAA) CTO written examination.

Who may enroll. Department of the Army civilian personnel and military personnel whose aptitude area scores meet the prerequisites for advanced individual training for MOS 93H or 93J and who—

- Require fresher training, or
- Require initial training in preparation for successful completion of the FAA CTO written examination, or
- Are considering MOS reclassification to 93H or 93J, or
- Are anticipating assignment to the air traffic control field.

How to enroll. Use DA Form 145. Send the completed forms to the Army Institute for Professional Development, U.S. Army Training Support Center, Newport News, VA 23628.

THREAT

Captain James A. Herberg
Threat Branch
Directorate of Combat Developments
U.S. Army Aviation Center
Fort Rucker, AL

Operational Maneuver Groups

THE NEXT WAR may start with little or no warning. It may start with a slow escalation of tensions between the major powers or perhaps because of conflicts in Third World countries. But no matter how it begins, one thing is inviolable: The Soviets will attack with massive forces forward in an attempt to destroy NATO's (North Atlantic Treaty Organization's) defensive integrity while driving to key objectives deep within NATO's interior and destroying or securing key military, political and economic installations before NATO can react with approval for nuclear weapons release. The Soviets plan to accomplish this through the use of the operational maneuver group (OMG).

The OMG is a relatively recent Soviet innovation which was introduced around 1976 as an answer to NATO's active defense. It had its beginnings back in World War II when the Soviets began organizing their armor and mechanized forces into mobile groups. Mobile groups, which were employed at the operational (army and *front*) level, were tasked with the mission of punching through the remaining enemy defenses where the Soviet attack had been most successful and striking deep into the enemy's defensive formations. These deep strikes, which were of corps and army size, forced the Germans to disrupt their *planned* defenses and reorganize in an attempt to stop the breakthroughs that occurred. Their front line defense thus thinned and with their mobile reserves committed to stopping the Soviet maneuver/mobile group, the Germans were unable to halt the Soviet advance and were forced to fall back and establish new defensive lines.[1]

The current Soviet OMG is a highly mobile, armor heavy, flexible strike force. Within a typical *front* organization, an OMG generally will be an army consisting of two to four divisions and possibly more. It is reinforced by airborne and heliborne forces, engineers, aviation, air defense and artillery. At the army level, the OMG will likely consist of a reinforced division. Artillery reinforcements may be as high as one artillery battalion for each maneuver battalion in an army level OMG.

An OMG at *front* level consisting of three tank divisions and one or two motorized rifle divisions would have about 1,100 to 1,400 tanks and 1,900 to 2,500 armored personnel carriers. Enhanced by massive artillery and aviation reinforcements, the Soviet OMGs, with their organic division aviation and artillery assets, possess the ability to rapidly concentrate fires anywhere along their intended route of advance.

Weapon systems such as the Frog-7, Scud-B and SS-12 Scaleboard, if employed in either a nuclear or chemical role, would allow the Soviet ground forces to eliminate defending forces before physical contact was made by their advancing troops. These weapon systems are available within the *front* and can be readily employed up to ranges of 900 kilometers. (They are currently being replaced by newer, more accurate weapon systems with greater ranges.)

The OMG is normally assigned deep objectives which are generally separate from the first and second echelon missions. The *front* level OMG is committed before the first echelon battle is completed and generally before the second echelon is committed. It may be committed as early as the second or third day of an offensive but usually after the enemy tactical depth (division rear) is reached. The *front* first echelon has the mission to destroy the enemy defense and attack through the immediate operational depth, 50 to 300 kilometers behind the forward line of own troops (FLOT). OMG objectives, while generally 100 to 150 kilometers deep, could extend further into the enemy operational depth. Key missions would be the destruction of enemy nuclear weapons and reserves, seizing of key terrain and airfields, and preventing reinforcement and enemy withdrawal. At the same time, a prime purpose of the OMG is to cause NATO forces

[1] C.N. Donnelly, "*The Soviet Operational Maneuver Group, A New Challenge for NATO*" (International Defense Review, 9, 1982), p. 1177-1179.

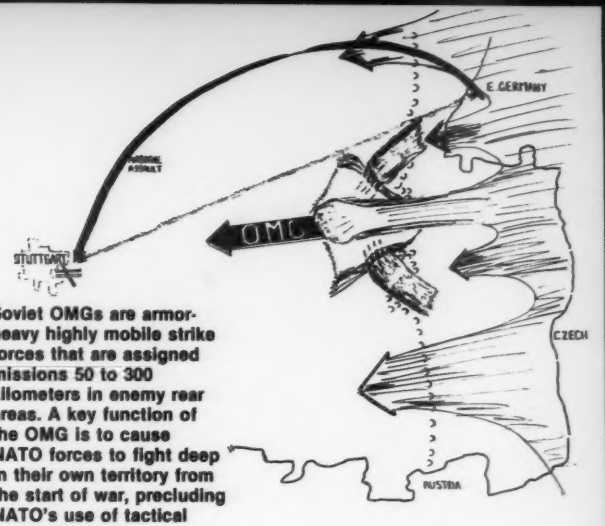
to fight in their own rear areas from the start of the war. This would preclude NATO's use of tactical nuclear weapons since there would be no definite separation of Soviet and NATO forces. Instead, the two sides would be intermingled, effectively preventing NATO tactical nuclear weapon use.

The army level OMG, while having the same missions as the *front* OMG, would be committed as early as the first day. Both OMGs would probably attack on an independent axis removed from a main attack axis. Even though they are committed as soon as possible, in cases where resistance is stiff, a second echelon may be committed before the OMG is, to weaken or breach NATO defenses, thus ensuring early success for the OMG. Once through the enemy front line defense, the OMG would move as quickly as possible to its ultimate objective. Along its route of march, an OMG may have intermediate objectives which it would attack but where it would avoid becoming decisively engaged.

OMGs would operate with relative autonomy behind NATO's front lines but they would attempt to maintain air and ground lines of communication with the *front* or army which controls them. Since each Soviet division carries 3 to 5 days' ammunition and 3 complete fuel loads, it becomes possible for OMGs to go very deep in NATO rear areas and operate for up to a week with minimal resupply. With the reestablishment of army aviation, the Soviet division has the organic capability to rapidly conduct minimal resupply and other airmobile missions. Additionally, up to 50 to 70 percent of a *front's* aviation may support the OMGs.[2]

Identification of OMGs is critical if they are to be successfully countered. Of course, the best time to defeat these forces is before they are committed, and early identification may be possible if the Soviets attack in the traditional echelon formation. OMGs are generally stronger than second echelon forces and both *front* and army level OMGs travel separately behind their first echelons and maintain separation as much as possible from the second echelons. The army OMG is about 50 kilometers behind the first echelon, while the *front* OMG is about 300 kilometers behind the *front* first echelon.

Additionally, *fronts* may put in operation multiple OMGs. The OMGs may be constituted from their own available armies or additional forces may be allocated to a particular *front* from the theater of military operations. Employment remains the same. However, multiple axes of advance—possibly converging on a single objective—are used. One other possibility presents itself when multiple OMGs are employed. It becomes much more likely for at least one OMG, once securely behind NATO front lines, to split into numerous small groups and attack many targets, destroying



Soviet OMGs are armor-heavy highly mobile strike forces that are assigned missions 50 to 300 kilometers in enemy rear areas. A key function of the OMG is to cause NATO forces to fight deep in their own territory from the start of war, precluding NATO's use of tactical nuclear weapons.

nuclear weapons and command and control facilities and disrupting rear area movement and resupply operations across the entire corps area.

When employed as a single entity, keys to the possible direction of attack for an OMG may lie with the particular maneuvers of the *front* air assault brigade or other airborne forces. In conjunction with the commitment of OMGs, air assault/airborne forces are launched with *specific* missions to seize or destroy nuclear weapons, storage sites, command and control centers, airfields, and critical road crossings and bridges. The seizure of airfields, road crossings and bridges would facilitate the rapid advancement of the OMG to its ultimate objective and permit the Soviets to rapidly resupply and reinforce the OMG by aerial delivery means. This could be crucial in the event the OMG is able to drive 300 kilometers deep into the NATO rear area in 3 to 5 days.

A further development in Soviet doctrine may call for the employment of all Soviet operational forces—*front* and army level—to be employed in a single echelon while using multiple OMGs. Divisions would continue to be echeloned but armies would not, and NATO plans to interdict a second operational echelon, with nuclear and conventional fires, would be futile. It becomes evident that if this maneuver is adopted, it will be extremely critical for NATO forces to stop the OMGs as quickly as possible.[3]

The destruction of Soviet OMGs with only conventional forces means hitting them in two locations on the battlefield:

- behind their lines, and
- behind our lines.

[2] ibid., p. 1184.

[3] LTC David M. Glantz, "*Soviet Operational Formation For Battle; A Perspective*" (Combat Studies Group, CGSC, 1982), p. 8.
FM 100-2, "*The Soviet Army*" (TBP FY 84)—General Reference.

TYPICAL FRONT ORGANIZATIONS (Most Forces Placed in 1st Echelon)		
A.	B.	C.
1st Echelon	1st Echelon	1st Echelon
2d Echelon	Operational Maneuver Group (OMG)	Combined Arms Reserve
Special Reserve	2d Echelon	Special Reserve
	Special Reserve	

FRONT CATEGORIZATION OF OBJECTIVE DEPTHS		
DEPTH	FRONT OBJECTIVES	INCLUSIVE LIMITS
Tactical (0-50 km)		To enemy division rear boundaries
Immediate Operational (50-300 km)	Immediate	Into enemy corps rear area
Operational (50-500 km)	Subsequent	Into enemy army group rear area
Strategic (500 km +)	Final	Remaining enemy forces, political and economic centers

In the first case, a highly mobile, powerful strike force is needed—one which is capable of reaching deep into the Soviet forces and returning to NATO's side of the forward edge of the battle area so that it can conduct additional missions. Virtually eliminated are NATO's ground forces due to their speed and excessive vulnerablity in attempting early cross-FLOT operations. What is left is Army Aviation and the Air Force. Through the use of corps assets (corps has an aviation brigade with 63 attack helicopters and also one air cavalry squadron with 26 attack helicopters), joint air attack operations could destroy a large number of Soviet armored vehicles before they ever made physical contact with the NATO ground forces.

In the second case, a highly mobile reserve force is required, but it has the additional requirement that it be able to defend and hold ground. For the second case, let's use the following scenario: The Soviets have launched a massive assault along a 300 to 400 kilometer front. Two tank armies have been organized into OMGs and are pushing forward to objectives deep behind the general deployment plan. At the same time, the Soviets have also launched two airborne divisions—assault elements only. They have targets and missions to seize and hold the airfield at Stuttgart and other suitable landing strips in the near vicinity to secure the airfield and landing strips for Soviet air landing operations and to link up with the OMGs moving rapidly in their direction. In conjunction with the Soviet OMG advance, air assault units from the air assault brigade have been inserted to secure critical road junctions, bridges, river-crossing sites, etc. Guerrilla forces are further isolating the Stuttgart area by cutting lateral lines of communication so that NATO forces cannot effectively defeat the Soviet airborne incursion. At this point, when most of NATO's forces are engaged defending along the front, the only element with the ability to attack at many different locations on the battlefield in a relatively short time is Army Aviation. The flexibility, mobility, firepower, and troop- and equipment-carrying capability inherent to Army Aviation make this force the logical choice to initially frustrate the enemy's airborne and OMG incursions. Yet, it is extremely difficult, if not impossible, for aviation to take and hold the ground on which it has just engaged the enemy.

Ground forces have the ability to hold the ground they take, but the time involved maneuvering these forces into position is the critical factor determining their use in the defeat of the Soviet forces. It therefore becomes obvious that a combination is required.

A large, mobile reaction force—both air and ground—would be ideal. However, this may not be possible. Accordingly, an alternative may be suggested, including an armor reserve force and assigning selected aviation units which already have a primary mission along the front with a secondary mission of reacting to Soviet incursions into our rear areas. Aviation's ability to move rapidly about the battlefield—both attack and lift units—makes this option a very distinct possibility when task organizing for the defense of Europe.

Once again, a combination of Air Force and Army Aviation forces could provide immediate firepower on the Soviet forces. While the ground force reserve was rapidly approaching, Army Aviation attack helicopters and Air Force ground attack aircraft, coupled with air transported antiarmor teams, would be destroying the Soviet forces as they attempted to push forward. Once the ground reserve was linked up with the air elements, they would contain and destroy the Soviet incursion and be able to hold the terrain.

Obviously, Army Aviation is an essential element in NATO defense plans. Only through the firepower and mobility of the attack helicopter is it possible—without resorting to unconventional weapons—to destroy the Soviet OMGs before they ever reach the forward edge of the battle area. Furthermore, without the flexibility afforded by Army Aviation, the OMGs may penetrate so deep that reserve forces are unable to effectively engage and stop the OMG from accomplishing its mission—a misson which it may have already accomplished by causing NATO to commit its reserves. On the other hand, Army Aviation *can provide the needed time* for ground reserve forces to move into position to defeat the advancing Soviet forces.

"Hangar Talk" is a quiz containing questions based on publications applicable to Army Aviation. The answers are at the bottom of the page. If you did not do well, perhaps you should get out the publication and look it over.

FM 1-230

Meteorology for Army Aviators

CW3 Gary R. Weiland
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1. What does a relative humidity of 50 percent indicate?
- a. The air is 50 percent water vapor
- b. There is a 50 percent chance of rain
- c. The air contains 50 percent of the water vapor that it is capable of holding at its temperature

2. The dew point temperature is that temperature to which air would have to be cooled for saturation to occur.
- a. True
- b. False

3. To produce other than light intensity precipitation, clouds usually have to be more than _____feet thick.
- a. 2,000
- b. 4,000
- c. 6,000
- d. 8,000

4. Frost is frozen dew.
- a. True
- b. False

5. The weather in a _____is frequently violent.
- a. Ridge
- b. Col
- c. Trough

6. The density altitude changes about____feet for each 1 degree Celsius variation from the standard temperature.
- a. 120
- b. 200
- c. 500

7. In a _____, the winds have a tendency to flow up mountain slopes on warm days.
- a. Valley breeze
- b. Mountain breeze
- c. Chinook wind

8. Dust devils are created by the same conditions which produce tornadoes.
- a. True
- b. False

9. Arctic air is colder than polar air.
- a. True
- b. False

10. Match the symbols with the type of front they represent.

a.

b.

c.

d.

1. Occluded
2. Cold
3. Warm
4. Stationary

11. Clear ice is more hazardous than rime ice.
- a. True
- b. False

12. The difference between fog and clouds is that the base of fog is at the surface; whereas, the base of a cloud is at least ____feet above the surface.
- a. 50
- b. 100
- c. 500

ANSWERS 1. c, para 4-3b 4. b, para 4-8b 7. a, para 6-9b 10. a-1, b-2, c-3, d-4; para 10-1b
2. a, para 4-4 5. c, para 5-5d 8. b, para 6-9i 11. a, para 14-3b(3)
3. b, para 4-7b 6. a, para 5-8b 9. a, para 9-6a(2) 12. a, para 15-1

MONTHLY WRITING AWARD

illustration by Jerry Byrd

The Trouble with Copilots

CW3 Craig R. Nixon
B Company, 8th Aviation Battalion (Combat)
APO New York

In July 1983 *Aviation Digest* published an article titled "Communication" by Major Craig Geis. Since then the Aviation Center has been designing a program of instruction intended to deal specifically with cockpit communication/teamwork. When this program is completed it is envisioned that not only students at Ft. Rucker but every aviator in the Army will be able to receive this training. The article which follows is an affirmation to the interest and effort "professionals" are willing to put forth.

THE CONCEPT OF the pilot as the information processing center of an aircraft is fairly well established. In the 1950s, aviation physiologists described the aircraft and its pilot as a closed-loop system. The pilot was seen as the nerve center of the aircraft. He or she takes in information, makes decisions and sends out control signals to cause the aircraft to react as desired. The copilot can be included in this "information loop" by the PIC.

Unfortunately, many pilots in Army Aviation "close the loop" without including the copilots. These pilots only include the copilots to prepare flight plans and the weight and balance forms. The result: valuable crewmembers unsure of their responsibilities. As expected, the copilots then "drop out" and assume no responsibility during the flight other than to half-heartedly do as they are told.

Copilots spend a lot of time just sitting and only occasionally are they invited to give the PICs a break. To effectively use copilots and include them in the information loop, PICs *must operate the aircraft using teamwork.*

Teamwork.

The "Random House College Dictionary" defines "teamwork" as: "cooperative or coordinated effort by a group of persons acting together for a common cause." If you add that the team is organized for a specific period of time under the direction of a leader, you have a good explanation of the optimum pilot-copilot relationship. For any team to succeed it must have direction. The direction of an aircrew team comes from the division of duties that the PIC establishes as team leader. The assignment of specific tasks for the copilot to do at certain times will eliminate much uncertainty in the team's operation.

Aircrewmembers are constantly receiving information from their environment while in flight. All of these inputs and the decisions they make about them form the workload they must maintain. When each member has a portion of the load, the total that can be carried is increased. This increased load-bearing division is the key to flying complex aircraft in demanding mission profiles.

The point of overload is established by task saturation. Pilots are task-saturated when the number of inputs they recognize and react to exceeds their capacity to perform them at an acceptable level. A well-briefed team, with a plan, has a higher reserve available for inputs. Their reserve keeps them further away from the saturation point, which equates to better mission performance and enhanced safety.

The teamwork performed by a pilot and crew is generally referred to as "crew coordination." If coordination is to truly occur, the atmosphere for teamwork must be established. Coordination for aircrews has three important aspects:

- Developing a harmonious relationship.
- Ensuring an interaction of the crew positions.
- Communicating effectively.

Harmony.

There is an old joke among UH-1 Huey pilots about the copilot being told to "sit on your hands and monitor the standby load meter."

This could be cited as an excellent example of ensuring that a harmonious relationship will never develop in the cockpit. The majority of copilots are fairly new to aviation. They are "paying their dues" until they can command their own aircraft. The PICs should have positive attitudes about teaching copilots even if they don't have the military occupational specialty identifier that makes them "real" instructor pilots.

The time between copilots and experienced PICs must be filled with many missions. It is the knowledge the copilots get on these missions that forms the graduate school of flying. Because this knowledge is so important, PICs must deal with copilots in a constructive and supportive manner. When copilots feel put down, or as second class citizens, they will not learn much on that flight.

Copilots must take an active part in their education. They must not be content to be the checklist reader and clearance copier. They must insist on being a constructive part of the crew. If the PICs don't supply the needed information, they should ask. PICs shouldn't take this as a personal attack on their styles of command, but rather as a professional querry.

Interaction = Crew Briefings.

The assignment of crew duties and all information required by the crew should be included in the crew briefing. All crewmembers (not just the copilot) should be *completely briefed.* Copilots' briefings are usually thought of as a bothersome requirement for your annual instrument checkride. In fact, they are *mandatory* for all flights. The more complex the aircraft or mission, the more important a crew briefing is to ensure safe accomplishment of that mission. Special consideration should be given to the most demanding tasks performed during a flight.

A mission profile for an AH-1 Cobra crew that includes a night terrain flight movement using night vision goggles to a battle position for multiple weapons engagements will have to be broken into several phases. While en route, the crew must divide the tasks of navigation, communication, flying, actions on contact and hazard identification, to mention a few. In the battle position, operations of weapons, order of engagement, position fixing when recovering from the pitch-up of long-range rocket fire, movement within a battle position, egress and many more duties must be identified and assigned *before the engagement.* The crew briefing in conjunction with careful planning are the best tools for a pilot to ensure safe, successful mission completion.

Cockpit Communication.

Coordination in the cockpit is made through communication. Good planning and briefings will be useless when the skids leave the ground if the crew falls victim to communication breakdown. The symbols of aviation jargon provide ample chances for missed communication. If the pilot states "I have the aircraft" when referring to an air traffic control (ATC) traffic advisory, but the copilot believes he is speaking of flight controls, the crewmembers may have a few anxious moments when they discover no one is at the controls of their aircraft. Symbols and jargon common to both pilots should be decided upon and used. Once you have established that a creek is a small river and a lake is a pond, stick with it for the whole flight.

Another form of communication breakdown common among aircrews could be called the "silent wonder." It is most common when two experienced aviators, who trust each other's ability, fly together. One pilot wonders what the other is doing but doesn't speak up for fear of looking stupid. You never know—the PIC may not know he is shooting an approach to a Winnebago instead of the inverted "Y" he thought was there. *If anybody in a flight crew wonders why or has doubts, it is time to speak up and confirm that everything is on an even keel.*

Briefing Guides.

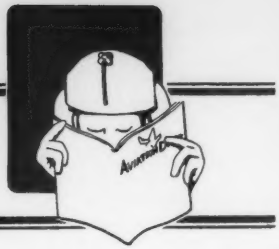
A briefing guide is a good tool to use to ensure your crew briefing is complete. A sample guide for use on all types of flights is in the figure. Specific duties of each crewmember have not been noted since they will change with each flight. Why not modify this guide to incorporate specific requirements found in your theater?

1. Mission
2. Weather
3. Duties of pilot at controls
4. Duties of pilot not at controls
5. Transfer of flight controls
6. Communication within cockpit
7. Communication with ATC and ground units
8. Required equipment
9. Special operations
   a. Weapons engagements
   b. Formation flights
   c. Sling loads
   d. NVG and tactical night flight
   e. Terrain flight
   f. Instrument flight
10. Crewchief duties
11. EMERGENCY PROCEDURES
12. GO/NO-GO
    a. Weather
    b. Power
    c. Control
    d. Fuel

While all the points mentioned above on crew coordination seem simple and obvious, many crews continue to have problems. A brief look at the accidents reported in FLIGHTFAX during the last few years shows examples of aircraft lost or damaged when crews didn't divide the tasks they were required to perform. As aircraft and missions become more complex, the interaction of a well-trained crew will grow in importance.

Copilots are only as good as the PIC lets them be. The next time you fly, be sure all crewmembers are tuned into and a part of the "system." Close the loop with your copilot and increase your safety margin. It is time to recognize copilots are there and for PICs to allow them to perform as a constructive part of the crew.

VIEWS FROM READERS



Editor:

All you have to do is get a group of aviators, air traffic controllers and commanders together and bring up the subject of vertical helicopter IFR recovery procedure (VHIRP) to cause some of the most heated and irrational arguments in aviation history.

I think it is time to take a rational look at VHIRP and eliminate the VHIRP from the regulations, the vocabulary and the Army abbreviations.

Before those of you who think I'm ignoring the dangers of inadvertent IMC, or the statistics that show that the majority of fatal accidents occur due to unexpectedly entering IMC conditions unprepared; hear me out.

Number one, I am not talking about eliminating ATM task 4510. This task should be taught and practiced religiously. It should also be renamed. It is not a VHIRP procedure. It is an inadvertent IMC procedure. Yes, I know the FAA does not recognize the term, but my contention is that you execute the inadvertent IMC procedure to save your life, then you execute a VHIRP that you are required to have in accordance with AR 95-1 and AR 95-50. Also, while we are changing the ATM, let's move this procedure to the emergency procedures task list where it belongs.

Anyone who has inadvertently flown into the soup, especially in a helicopter, will tell you he has a real emergency on his hands. In order to save his life at this point, he must transition immediately to instrument flight and control the aircraft. He must climb to avoid obstacles; he must admit he has an emergency to ATC, the agency by the way is prepared to handle emergencies; and then he must get an approach. Later he will probably be violated for entering controlled airspace without a clearance, but he will be alive and so will his passengers. Yes, I also know VHIRP is a procedure only for aircraft operating in a tactical area low level, and the regulation requires a specific recovery fix and routes, etc. We must have aviators trained to check weather; we must have commanders trained to avoid sending aircraft into marginal weather. We do not need aviators or commanders who think they can fly in any kind of weather and survive because they have a VHIRP; they will surely kill someone.

We don't need to hassle FAA with a procedure that they don't want, that they don't need and that confuses the issue of a legitimate emergency. We don't need a procedure that may cause an aviator in an OH-58 to switch frequencies, transponder codes, navigate to a fix while he is by himself and scared to death, and eventually lose control of the aircraft.

I've actually heard ATC suggestions that in case of an actual VHIRP the aircraft proceed to an ADF fix and hold to avoid tying up other IFR traffic. If he has survived so far, this will surely kill him.

To reiterate, what we need is aviators and commanders trained to judge weather and use good judgment. We need to train them, should they enter the clouds, to transition to instruments, control the aircraft, squawk emergency and ask for a radar approach or vectors to an airfield.

We can "what if" VHIRP forever. There is no way we can make a procedure that is fail-safe. If the pilot is in the soup and can't contact approach and his ADF fails, etc. If we've got to have a VHIRP, keep it simple. Make sure that everyone knows that it is a procedure to be used only in a direct emergency, that it is not a license to enter IMC without a clearance.

I am sure that there are arguments on the other side. I've heard most of them, but personally I think VHIRP is a procedure that attempts to coordinate the use of bad judgment beforehand, makes a bad situation worse and requires ATC to reserve airspace needlessly.

Let's quit kidding ourselves and others. Train for inadvertent instrument meteorological conditions that can be used anywhere; during terrain flight, a hovering white-out or VFR cross-country, and stop wasting time on VHIRP.

MAJ Leroy A. Wall
Oklahoma Army National Guard
IFE, SIP, MRAV,
ASO, ATP, etc.

Editor:

Reference your list of recommended publications, page 34, April edition *Aviation Digest* (for threat officers to use in their units).

For your information Defense Intelligence Agency (DIA) publications used by the Army are listed in DA Pam 310-1 (Section 3) and are stocked and issued by the AG Publications Center, Baltimore, MD. Users may requisition the DIA publications like any other Army publication.

Also, DA Pamphlets 310-2, 310-3, 310-4, 310-6, and 310-7 have been eliminated by consolidation in DA Pam 310-1. The Consolidated Index of Pubs and Forms (310-1) now contains approximately 6,000 pages and is updated quarterly in 48x Microfiche. Users may subscribe by completing DA Form 12-4 Block 17.

Point of contact for additional information is Mr. Jack Doyle, AUTOVON 221-6242.

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Army Aviation Annual Written Examination (AAAWE)

Training Tool or Wrench in the Works?

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Emerging Systems Division
Directorate of Training Developments
U.S. Army Aviation Center
Fort Rucker, AL

JUST THE MENTION of the AAAWE, more commonly known as the "Annual Writ," brings a frown to the face of even the most jovial Army aviator. Of all the Annual Aviator Proficiency and Readiness Test (AAPART) requirements the Annual Writ is probably the most unpleasant. Just imagine, all those hours of work and not 1 second of flight time. And the books! Those mystifying printed monsters—most of which the average aviator hasn't seen since last year's Annual Writ. This foreboding image of the AAAWE need not be the case. Properly used, the AAAWE can be a valuable asset to a unit training program.

Although often maligned for being irrelevant and outdated, the process for developing the AAAWE is actually very responsive to the dynamic needs of Army Aviation. The Annual Writ Team of the Directorate of Training Developments (DTD) at the U.S. Army Aviation Center, Ft. Rucker, AL, is responsible for developing each year's examination. To accomplish this difficult task, the Annual Writ Team analyzes past AAAWE results as well as the results of oral examinations conducted by both the Directorate of Evaluation and Standardization (DES) and the Directorate of Training and Doctrine's (DOTD) Department of Flight Training. Two categories of questions are developed from this analysis. One will support the AAPART requirements by focusing on weak areas identified in oral examinations. The other will concentrate on subject areas not normally covered in oral exams. In addition to the Annual Writ Team, the AAAWE Policy Board was formed in January 1983. The board is comprised of members from DTD, DES, DOTD and the Directorate of Combat Developments. It provides guidance to the efforts of the Annual Writ Team, responds to the U.S. Army Aviation Training Symposium/Policy Committee and serves as a point of contact for members of the Army Aviation community desiring to make direct input to the AAAWE.

Rather than view the AAAWE as an albatross around the neck of every aviator, commanders should see the Annual Writ for its training value. First of all, the AAAWE is an excellent annual refresher training session for each aviator. It gets the pilots back into the books to review a variety of aviation subjects. It also serves to emphasize changes in Army Aviation information in areas such as regulations, doctrine, flight procedures, new equipment and safety. Additionally, the AAAWE can be used as a review for the other AAPART requirements. Finally, the results of the AAAWE are a valuable training indicator. Commanders who take the time to review which questions are being missed by their pilots can gain insight into the deficiencies in their training programs. Poor scores in a particular subject area, by one aviator, may be an indication of an individual training weakness. Likewise, poor scores by several aviators in the same subject area may indicate a unit training deficiency.

The AAAWE, like it or not, is here to stay. Much effort is expended every year to keep the AAAWE current and responsive to the ever changing needs of Army Aviation. Commanders who fail to emphasize the value of this excellent training vehicle are surely short changing their training program.

To make comments and suggestions concerning the AAAWE, contact:

Commander
U.S. Army Aviation Center
ATTN: ATZQ-TD-TAD-TD (AAAWE)
Ft. Rucker, AL 36362
AUTOVON: 558-5318/5385

NUCLEAR BIOLOGICAL CHEMICAL

Aircraft Decontamination

First Lieutenant Dave McKenna and Sergeant First Class Ken "Bud" Strickland (Ret.)

ONE PROBLEM which will be encountered in the AirLand Battle is contamination of aircraft by chemical agents. The 101st Aviation Battalion (Assault Helicopter), 101st Airborne Division (Air Assault), Ft. Campbell, KY, has conducted some tests in this area. There is little doctrinal guidance for aircraft decontamination, so SSG Regis O'Neil and MSG Hulon Jackson fabricated a complete Aircraft Decontamination System (ADS), using items currently available in aviation units or in the Army supply system. Several problems had to be tackled and resolved. The techniques described here were found effective for this unit. Other units may find different ways to decon its unit aircraft based on mission, location or materials available.

• **What Should Be Used To Decontaminate The Aircraft?** Current Army decontaminants are not suitable for Army aircraft, since DS2 glazes Plexiglas and both DS2 and STB corrode airframe materials. Other developmental decontaminants also have limitations; West German C-8 emulsion contains a carcinogen and the U.S. Navy's self-limiting aqueous solution of hypochlorite is not effective against thickened nerve agent. Chemical Research Development Center (CRDC) is investigating two other systems which appear promising, the Surface Active Displacement System and the Soft Halgen System. Each of these systems will take several years to field, and we have a problem right now. Dugway Proving Ground investigated field expedient decontaminants and found that JP-4 will remove 89 to 97 percent of thickened agent. CRDC found that concentrated cleaner C-42 (national stock number 6850-00-935-0995), used full strength, is as effective as the C-8 emulsion but not quite as effective as DS2 on painted surfaces. For the above reasons, it seems that a JP-4 scrub, followed by an aircraft cleaner scrub and water rinse, will remove surface contamination from aircraft surfaces. Though use of JP-4 for cleaning of aircraft is not a widely accepted practice, the unit commander may decide that the mission dictates the use of JP-4 as a field expedient decontaminant be authorized.

• **How Much Of The Aircraft Should Be Decontaminated?** The amount of decontamination will depend upon the aircraft mission. If the aircraft must come in and refuel/rearm and immediately return to battle, selected aircraft areas should be decontaminated—fuel ports, gun systems, rocket pods, missile rails, handles, steps and passenger compartments (diagram at right). For this situation, the majority of the aircraft surface will not be decontaminated. When maintenance/preflights/post flights must be pulled, those areas to be checked should be decontaminated; for example, fasteners, steps and handles. Both of the above situations may not be possible due to the mission and the aircraft may have to fight dirty. Maintenance in the field may have to per performed in MOPP (mission oriented protection posture) gear, but at least the commander has a choice.

• **How Should The ADS Be Organized?** If adequate personnel and equipment are available, the decontamination area should be ready before the arrival of the aircraft with communications equipment and trained ground guides. Recognition panels may be used instead of radios. Once the aircraft has landed, passengers may go to a Personnel Decontamination Station (PDS) and the aircraft will receive either mission turn-around decontamiantion or more complete maintenance decontamination. The aircraft should be shut down if possible because the rotor wash may drive chemical agents through the overgarment. If aircraft shut-down is impossible, personnel refueling and

rearming the aircraft should wear wet weather gear to protect the overgarment from moisture. Once aircraft have landed in a decontamination site, they will not be moved until decontamination is finished. The aircraft then continues the mission. The following is a list of equipment needed.

equipment:	quantity:
Chemical protective ensemble, rain gear	1 per person
50 foot hoses	5
Shovel, pointed	4
Pick, mattock type	2
Nozzle, garden hose	2
Can, ash and garbage	8
Covers, ash and garbage	8
Pails	6
Slings and tie-down straps	as needed
Couplings, 2 inch to garden hose (to be fabricated)	

• **How Should The Decontamination System Be Transported?** For the ADS developed at Ft. Campbell, all the equipment can be carried on two mules. The forward area refueling equipment pump assembly can be mounted on one mule and all other equipment (mops, buckets, brushes, hoses) on another. Personnel will move by UH-60 Black Hawks or by ground vehicles, and the ADS can be slingloaded to the decon site.

• **Would Decontamination Significantly Reduce The Hazard To Crew And Ground Personnel?** There are two types of equipment decontamination: partial or complete. The ADS is designed for partial (mission turn-around) or complete (maintenance related) decontamination and will greatly reduce the liquid contamination threat. This may allow commanders to modify MOPP 4 levels for aviators and crewmembers depending upon the heat load and the level of decontamination of equipment achieved.

With an ADS set-up, an aviation unit can establish its own decontamination site and can partially decontaminate an aircraft in 15 to 25 minutes. Until other equipment becomes available, the ADS provides realistic, real-world decontamination for aircraft.

When this article was published in "The Eagle NBC Report, Bulletin 4-82," LT McKenna was the 101st Aviation Group chemical officer and SFC Strickland was the Group's chemical NCO in the 101st Airborne Division (Air Assault). SFC Strickland retired recently and LT McKenna is now platoon leader, 3d Platoon, 63d Chemical Company. The Aviation Digest appreciates permission to reprint this article.

Army Aviation Development Test Activity

EVERY MAJOR piece of Army Aviation equipment undergoes some kind of testing. One of the primary testers is the U.S. Army Aviation Development Test Activity (USAAVNDTA) at Ft. Rucker, AL. Have you ever wondered why all the testing? On the surface, it may appear that we test for testing's sake, but appearances can be and often are deceiving. Each agency has its own unique functions and its own mission. The operational tester looks at how well the equipment can be used by the field soldier. The airworthiness tester examines the engineering flight characteristics of the system. the USAAVNDTA is primarily responsible for developmental testing.

The USAAVNDTA is a part of the U.S. Army Test and Evaluation Command, Aberdeen Proving Ground, MD. To accomplish its complex mission and remain competitive in the testing marketplace, the Activity has developed a cross section of engineering and technical experts, including highly qualified experimental test pilots, engineers, mathematicians, technicians and other support personnel. That know-how, plus a full range of instrumentation equipment, an engine test facility, and a location that offers more-than-adequate airspace and test ranges, is the basis for the confidence Activity people (about 200 military and 100 civilian) have in their ability to do an outstanding job. One of the Activity's major assets is people; it is fortunate to have a mix of civilian engineers and technicians along with military personnel, nine of whom are graduates of the Navy Test Pilot School, Patuxent River, MD. This expertise melds very well to allow timely execution of the developmental testing mission.

Just what is a developmental test? Colonel William B. Woodson, USAAVNDTA commander, elaborated on the subject: "The aviation developer is the U.S. Army Materiel Development and Readiness Command community; we test the items they have developed, hence the name developmental testing. This includes everything from the entire aircraft to the wheel jack. Right now, we're running a little more than 100 projects, which is about average. We check to see that the item to be acquired actually meets the specification it is required to meet. In other words, our ultimate goal is to ensure the Army Aviation unit in the field receives the finest possible equipment and weapons that can be made available, given the constraints of time and money."

Major Frederick W. Dickens, chief, Management and Plans Divi-

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Betty J. Goodson

sion, commented on the contributions of the engineers and test pilots to mission accomplishment: "From a managerial standpoint, we could not operate without the technical expertise the test pilots and engineers provide. Because of their specialized training and experience, they team together to make quick and accurate judgments as to whether or not a proposed test program will meet the customer's objectives, or if necessary data has been gathered to report on the system under test."

Another group of key players in the success the Activity has enjoyed is the test coordinators. These highly experienced military and civilian people bring the business to the Activity and then ensure the Activity produces what it promised. Fred N. Till, a test coordinator for 17 years, commented on the role the Activity plays in safety testing: "Whenever a change needs to be made to an aircraft, we get the first article (new part) and test it to see that it is an improvement and that it does not create any new problems. We check to see that it will, in fact, make the aircraft perform better and safer than it did before. For example, because of a recent tension-torsion (TT) strap failure in the tail rotor of a TH-55, we have a test TT strap that we are going to run for 600 hours. Will it be failure-proof and thus safer? Only the test will tell!

"The program manager (PM) sets a time limit for a component's test, and sometimes it is not adequate for a thorough check. For instance, about 15 years ago, we received a new windshield to test on the UH-1 Huey. We were told to use it for 150 hours to see if the manufacturer's claim, that sand would not scratch it, was true. Well, it worked beautifully; there were no scratches. When the test was finished, we got the sponsor's permission to continue to use the windshields. It's a good thing, too, because a few weeks later one of them started to craze and eventually cracked. The point is, if we had taken them off at the time suggested by the PM, the Army would very likely have bought a lot of windshields that would have failed. We're still testing Huey windshields, by the way."

As COL Woodson mentioned, the Activity is involved in everything from the entire aircraft to wheel jacks. One test now in the planning phase is the Army Helicopter Improvement Program—the OH-58D Kiowa. This test is one that will test the tester. The Activity has been given a very brief time to determine the aircraft's reliability, availability and maintainability—test the mission equipment—remove and replace the majority of the aircraft's parts to ascertain skill level needed for maintenance people—check correctness of manufacturer's manuals—and determine if the recommended special maintenance tools are necessary. This is where the expertise of the test pilot, engineer and test coordinator must come into full play. Imagine, for the moment, that you were given the job—how would you go about accomplishing that in a few short months? Rest assured the Activity will satisfy its objectives and do it with a pride and satisfaction that is the hallmark of a professional.

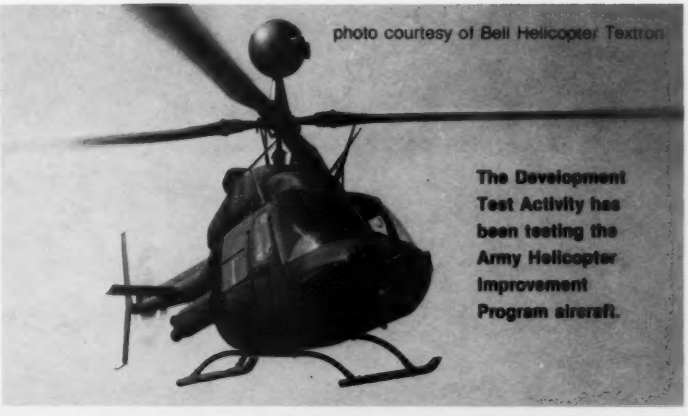


photo courtesy of Bell Helicopter Textron

The Development Test Activity has been testing the Army Helicopter Improvement Program aircraft.

One of the other ongoing major aircraft tests involves the CH-47 Chinook Modernization Program. The CH-47 Modernization Program has been underway for several years; and USAAVNDTA has been and still is heavily involved with testing the program's product, first with the prototype aircraft and now with a production "D" model. The Activity's test coordinator for that testing, Mr. Manny Venegas, said the modernization of A, B and C model Chinooks covers most of the aircraft's components, including improved electrical systems, an advanced flight control system and improved avionics. Three changes he considers extremely valuable are the more powerful engines that can provide emergency power if needed, three cargo hooks instead of one and fiberglass rotor blades instead of metal. According to Mr. Venegas, the fiberglass blades are another example of the need for testing. The blade was designed to improve the aircraft's survivability. For example, it is alleged that a 50 millimeter shell could go through the blade, making a clean hole that might not cause the ship to have to land. Conversely, such a shell would most likely damage a metal blade so heavily that the aircraft could not remain airborne.

What the developer did not know was that sand hitting the fiberglass blade's titanium leading edge produces a spark which lights the blades up at night so they "look like a Christmas tree." This is referred to as a corona effect. You can imagine the visual signature this would provide for the enemy. Of several corrective measures tried for that fault, the best one is a special sand-resistant paint. Developed by the contractor, the paint eliminates the corona effect—as long as the helicopter does not fly in the rain (another limitation discovered during testing) because the paint will wash off. That's not a fatal flaw, Mr. Venegas noted, since it doesn't rain very often in the desert—and even if it is washed off, the paint can be sprayed back on rather quickly.

One part of the CH-47D testing that the special paint would not have survived was the landings made on Ft. Rucker's Lake Tholocco. Of course, that kind of operation is not uncommon for the cargo

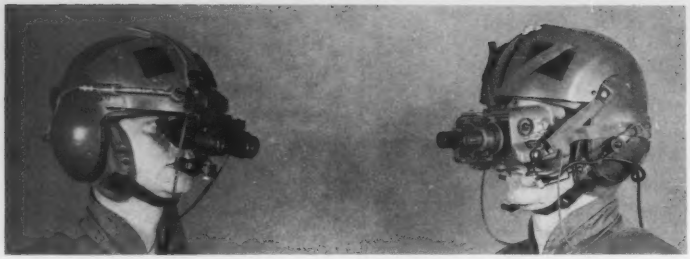
Three cargo hooks are better than one on the modernized CH-47.

photo courtesy of Boeing Vertol

helicopter; the daytime nautical capabilities of other Chinook models have been well documented. But last summer's landings were as different from previous ones as night is from day, because *they were—night landings.*

CW3 Thomas B. Smith was the project officer, and he said the first step was water survival training for the test participants. The teachers were people from the local physical fitness center and members of a Navy seal team from Panama City, FL. Their excellent instruction, which included blind egress training, helped everyone feel more comfortable about hitting the water at night in a blacked-out, 10-ton helicopter. "We learned some things about the Chinook early on that we had never thought of before," CW3 Smith said. "One of those was the realization that we had been going into the water with everything buttoned up, so there would have been no escape route if one had been needed. To correct that, we removed the emergency escape panel on the left side, raised and secured the upper half of the cabin entrance door, and retracted the rap extension with the ramp fully up, giving us three positive exits."

That is the kind of challenge that keeps the test team members on their toes. The results of the testing were passed on not only to the CH-47 program manager but were also shared with the U.S. Army Safety Center for its use in accident prevention.



The ANVIS, left, weighs less than the PVS-5, right. ANVIS also is much more comfortable and the optics provide a much clearer, sharper view.

Captain Patrick O. Richardson is testing the aviator night vision imaging system (ANVIS). He explained that ANVIS is the third generation of night vision devices, the second generation of goggles and the first device made specifically for aviators (see May 1983 *Aviation Digest*). The development performance test CPT Richardson managed included comparison with the PVS-5 night vision goggles, which led to the consensus that the ANVIS is far superior.

"With the ANVIS, most of the restrictions on the amount of light you can fly with are removed; you can go down to nap-of-the-earth altitudes with starlight alone. When you get down there, instead of seeing a tree branch as you would with the PVS-5, you'll see individual leaves. The resolution and acuity of the ANVIS optics are much better," said CPT Richardson.

The ANVIS performed superbly during test flight in the snow of Alaska, sand of Arizona and tropic environment of Panama. CPT Richardson displays the confidence that must be possessed if a project pilot is to test at the extremes of the human performance envelope. Many of the things done by CPT Richardson had not been done by any other aviator. The calculated daring, combined with technical judgment, are the ingredients required of an Activity project pilot.

To recount that project officers from USAAVNDTA go to Alaska and Panama and other parts of the world to conduct tests reflects only part of the investment the Activity makes in such missions. Behind the scenes is work done by Tom Ford and the people in the Maintenance Support Branch to provide logistics for those trips. Aircraft have to be available to meet the tests' specifications, and many times that means modifying existing items or installing new ones on the aircraft. Such modifications can mean that if the aircraft needs repair work while it is away from Ft. Rucker, a technician from Mr. Ford's branch will have to make a house call, wherever the "house" is.

All maintenance on the Activity's 27 aircraft is done by contractor employees who have an average experience level of 15 years, Mr. Ford said. He claims the excellent work they do is an asset, not only to the Activity but to the rest of Ft. Rucker, which benefits from the shop's limited depot capability. "We don't claim we can do a complete overhaul," he said, "but we can refurbish engines and put them back in the system quickly—and that saves time and money. Not every maintenance shop can do that, and it's only the experience and dedication of the contractor technicians that makes it possible for us to do so."

COL Woodson is in complete agreement about the enthusiasm shown in mission performance, and he includes all Activity personnel—military, civilian and contractor. But he does have one concern: "I must continue to guard against the proliferation of testing that seems to creep into the development of new weapons systems. We work very hard with other testors to make sure we don't repeat each other. Duplication results in waste—waste of time and waste of money. For example, we cannot afford to repeat the testing accomplished by the U.S. Army Aviation Engineering Flight Activity at Edwards AFB, CA, nor can it repeat our testing. We also need to look long and hard at the duplication of facilities. If we don't talk to each other, we can discover we both have procured an expensive piece of test equipment when we could have gotten by with one item and shared it. At the price tag on instrumentation and computers, we just can't let that happen.

"My concern extends beyond pure economic factors. I'm also worried about the length of the development cycle. As a tester, I use up a big part of the time allotted to the acquisition process. If we can shorten testing through consolidation of test facilities, I'm all for it. At the rate of technological advance and conversely technological obsolescence, we can't tolerate playing around with a new piece of equipment for 1 or 2 years in the test phase. Consolidation of testing is one of the things we ought to look at to shorten the test cycle.

"Other than that, I don't really need a whole lot of anything to do a better job. We get superb support from the Army Aviation Center commander and all of his people, and we have the Army Safety Center and the Aeromedical Research Laboratory right here, and everybody works as a team."

There's no better way to conclude an account of the U.S. Army Aviation Development Test Activity's outstanding mission performance than to use COL Woodson's words: "Professionals testing for professionals—trial before combat."

U.S. Army Communications Command
ATC ACTION LINE

Controlled Flight Toward Terrain Studied

Reprinted from *Business and Commercial Aviation*, August 1982, Ziff-Davis Publishing Co., Copyright 1982.

DURING THE 1930s U.S. Army aviation accident rates soared, and a special team was designated to investigate the problem. After careful study, the committee reported that the primary cause of aviation accidents was aircraft striking the ground.

That conclusion may seem witless to the experienced aviator, but it can be interpreted in a more intelligent sense. Too many aircraft accidents are the result of controlled flight into terrain (CFIT), as the accident investigators categorize it. CFIT involves an airplane in normal flight, with no emergencies and no warning to the flight crew of impending trouble, striking the terrain at some point other than the runway.

Recently, Battelle Memorial Institute, of Columbus, OH, completed a study of Aviation Safety Reporting System (ASRS) reports to analyze those which involved controlled flight toward terrain [CFTT]. CFTT incidents are potential CFIT accidents.

A total of 258 ASRS reports were identified in which aircraft, under control, were flown toward the ground, water or some obstruction on the ground. Several useful conclusions were drawn from this study:

- Human error is the single, greatest identifiable cause of CFTT incidents and, presumably, CFIT accidents. In 64 percent of all studied CFTT occurrences, someone made an error or omission.
- About two-thirds of those human errors were attributed to air traffic controllers. The most common discrepancy was a radar vector below the minimum vectoring altitude. Improper radar vectoring occurred in 46 of the cases studied, while only 3 incidents happened during standard instrument departures, and none occurred on standard instrument arrival routes, except when there were radar vectors off the route.
- Radar vectors in mountainous terrain particualrly are conducive to controller error.
- Errors by pilots were much more diverse, including a few mistakes of gross altitude excursion.
- A contributing factor in CFTT incidents may be that pilots do not have information on minimum vectoring altitudes. Any radar vector below published chart minimums must be accepted on faith by the flight crew.
- The study concluded that ground proximity warning systems and minimum safe altitude warning systems were responsible for averting at least six catastrophic air carrier accidents. In 12 other cases those systems provided the first warning of danger. Unfortunately, the study also concluded that pilots who have experience with such systems often are skeptical of them because they generate too many false alerts.
- The study suggested that any approach clearance to a runway where the ILS glide slope is out of service should include a reminder of that fact.

CFIT accidents usually are fatal and normally can be avoided by simple cockpit management, attention and communication. Basic terrain awareness and disciplined use of electronic glideslope or VASIs, where available, can minimize the risk.

Readers are encouraged to address matters concerning air traffic control to:
Director, USAATCA Aeronautical Services Office, Cameron Station, Alexandria, VA 22314

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Aviation Life Support Equipment (ALSE) School

Fort Eustis, Virginia

The ALSE School is in full swing and is conducting courses of training in ALSE on inspection, maintenance and repair of this critical equipment. Recent visits by staff personnel and the Aviation Life Support Equipment Management Steering Council revealed the determination and dedication of the instructors and the overwhelming enthusiasm of the students. Even with this zeal, we feel we can help to make the training better through making available adequate training aids. We are therefore asking others in the ALSE community to look around and see if you have any items of ALSE which could be sent to the school for their use. Please call one of the following instructors on AUTOVON 927-3001/5510: MSG Jack Ooten; SFC Bruce Amos; SGT Barney Baker; SGT Frederico Western; and if all else fails you can call Mr. Ed Daughety, AUTOVON 693-3307. PEARL will certainly appreciate any support you can give.

A.B.C. Davis Jr.
DARCOM Project Officer
Aviation Life Support System